Answers

ACCA examiner's answers

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1 ABC Co

> **Text references**. Performance analysis and corporate governance are covered in Chapter 1.
>
> **Top tips**. Don't be tempted in part (a) to calculate endless ratios and not leave enough time for the discussion. This type of analysis is an essential skill for the F9 exam so make sure you are happy with the technique.
>
> In parts (b) and (c) make sure you answer the specific requirement and don't simply regurgitate textbook knowledge.

(a) **Ratio analysis**

	Current year	Previous year
Profitability		
ROCE		
(PBIT/Long-term capital)	14,749/(39,900 + 14,000) = 27.4%	13,506/(35,087 + 17,500) = 25.7%
Debt		
Gearing (Debt/Equity)	14,000/39,900 = 35.1%	17,500/35,087 = 49.9%
Interest coverage (PBIT/Interest)	14,749/1,553 = 9.5	13,506/1,863 = 7.2
Shareholders' investment		
EPS	8,849/14,000 = €0.63	7,917/14,000 = €0.57
Share price (P/E × EPS)	14.0 × 0.63 = €8.82	13.0 × 0.57 = €7.41
Dividend per share	4,800/14,000 = €0.34	3,100/14,000 = €0.22
Dividend yield (DPS/Share price)	0.34/8.82 = 3.85%	0.22/7.41 = 2.97%

The performance of ABC Co

A shareholder of ABC Co would probably be reasonably pleased with their performance over these two years.

Growth of income

The company has grown in terms of turnover and profits. **Turnover** has grown by 9.6% ((74,521 − 68,000)/68,000 × 100%) and **return on capital employed** has increased from 25.7% to 27.4%. There may be some concern over the 25.4% increase ((11,489 − 9,160)/9,160 × 100%) in **other costs** and more information would be needed to determine if this is a one-off increase or a worrying long-term trend. **Salaries and wages** have only increased by 2.4% ((20,027 − 19,562)/19,562 × 100%) so employees may be less pleased with the situation. Employee discontent could create problems for the business in future.

Gearing

The financial risk that the shareholders are exposed to does not appear to be a problem area as **gearing** has decreased from 49.9% to 35.1% and **interest cover** is more than sufficient. The company may want to consider increasing gearing to invest in suitable projects and generate further growth.

Shareholder return

The **shareholders' investment ratios** all indicate that shareholders' wealth has increased. The **share price** has increased by 19% ((8.82 − 7.41)/7.41 x 100%). The **total shareholder return** is $(P_1 − P_0 + P_1)/P_0$ = (8.82 − 7.4l + 0.34)/7.41 = 23.6%. This is probably sufficient to satisfy shareholders. The **P/E ratio** reflects the market's appraisal of the share's future prospects and this has improved. It is still lower than the industry average which suggests that more growth could be achieved.

(b) **Manipulation**

Accounting profits can be **manipulated** to some extent by choices of **accounting policies**. For example, the depreciation amount will depend on the basis of calculation of deprecation and development costs can be **capitalised** instead of being written off to the income statement.

Risk

Profit does not take account of **risk**. Shareholders will be very interested in the level of risk, and maximising profits may be achieved by increasing risk to unacceptable levels.

Volume of investment

Profits on their own take no account of the **volume of investment** that it has taken to earn the profit. Profits must be related to the volume of investment to have any real meaning.

Short-term performance

Profits are reported every year (with half-year interim results for quoted companies). They are measures of **short-term** historic performance, whereas a company's performance should ideally be judged over a longer term and **future** prospects considered as well as past profits.

(c) **Corporate governance** is the system by which organisations are directed and controlled.

Those directors who have the power to direct and control the organisation also have the duty of accountability to the organisation's stakeholders.

Although the directors' role is a key one in deciding how the divergent interests of the various stakeholders should be promoted, the directors primary duty is to **enhance the value of shareholders' investment** over time.

Corporate governance regulation aims to control the ability of the directors to promote their own interests and ensure adequate disclosure of their activities. This is achieved by the use of independent non-executive directors to staff committees that monitor the following areas:

(i)   The management and **reduction of risk**. This is monitored by an **audit committee** staffed by non-executives and ensures that areas of risks are being identified and managed in an appropriate way.

(ii) **Incentives** to senior management to maximise shareholder wealth. This is monitored by a **remuneration committee** to ensure the incentives are appropriate and not over-generous.

(iii) Good governance provides a **framework** for an organisation to pursue its strategy in an **ethical and effective** way from the perspective of all stakeholder groups affected, and offers safeguards against misuse of resources, physical or intellectual. This is achieved by giving non-executive directors significant voting power at board level and by separating the role of the MD and the chairman to ensure that one individual does not exercise excessive power.

Businesses that **comply** with corporate governance regualtions can therefore help to manage under-performance by:

(i)   Identifying the under-performing areas as part of their **risk-management** processes.

(ii) Ensuring that management is **incentivised** to deal with issues that have been identified.

(iii) Controlling the **corporate strategy** of the company and ensuring it is effective and well thought out.

2 RZP Co

Text reference. Performance analysis is covered in Chapter 1.

Top tips. It is important to read the question clearly. Thus, in part (a) the question states exactly what you are required to calculate. So for instance, share price growth for each year and then the arithmetic mean and equivalent annual growth rates.

Easy marks. Set out your workings to part (a) in a table such as that in our answer. It helps the marker and allows you to pick out key figures for calculating means and growth rates. Don't worry if you had trouble with the equivalent annual growth rate, the discussion areas in part (c) are a source of easier marks.

Examiner's comments. Part (a) required candidates to analyse information provided, and comment on views expressed by a chairman on dividend growth, share price growth, and earnings growth. Candidates who commented on the chairman's views without analysing the information provided gained little credit.

The requirement in part (b) was to calculate total shareholder return and comment on the result. The question explained that total shareholder return was dividend yield plus capital growth. Most candidates were unable to calculate dividend yield.

Part (c) asked for a discussion of the factors to be considered when deciding on a management remuneration package that would encourage shareholder wealth maximisation. The key to answering this part was an awareness of how the actions of managers might lead to an increase or decrease in shareholder wealth.

Marking scheme

			Marks
(a)	Growth in dividends per share: analysis/discussion	4–5	
	Share price growth: analysis/discussion	4–5	
	Growth in earnings per share: analysis/discussion	4–5	
		Maximum	13
(b)	Calculation of total shareholder return	2	
	Comment	1	
			3
(c)	Discussion of factors	5–6	
	Examples of appropriate remuneration packages	4–5	
		Maximum	9
			25

(a)

Year	20X4	20X3	20X2	20X1	20X0
Dividend per share	2.8p	2.3p	2.2p	2.2p	1.7p
Annual dividend growth	21.7%	4.5%	nil	29.4%	
General price index	117	113	110	105	100
Real dividend per share	2.4p	2.0p	2.0p	2.1p	1.7p
Annual dividend growth	20.0%	nil	(4.8)%	23.5%	
Earnings per share	19.04p	14.95p	11.22p	15.84p	13.43p
Annual earnings growth	27.3%	33.2%	(29.2)%	17.9%	
Price/earnings ratio	22.0	33.5	25.5	17.2	15.2
Share price	418.9p	500.8p	286.1p	272.4p	204.1p
Annual share price growth	(16.3)%	75.0%	5.0%	33.5%	

(i)   Average dividend growth:
Arithmetic mean = (21.7 + 4.5 + 0 + 29.4)/4 = 55.6/4 = 13.9%
Equivalent annual growth rate = $[(2.8/1.7)^{0.25} - 1] \times 100 = 13.3\%$

Average real dividend growth:
Arithmetic mean = (20.0 + 0 − 4.8 + 23.5)/4 = 38.7/4 = 9.7%
Equivalent annual growth rate = $[(2.4/1.7)^{0.25} - 1] \times 100 = 9.0\%$

(ii)   Average share price growth:
Arithmetic mean = (−16.3 + 75.0 + 5.0 + 33.5)/4 = 97.2/4 = 24.3%
Equivalent annual growth rate = $[(418.9/204.1)^{0.25} - 1] \times 100 = 19.7\%$

(iii)   Average earnings per share growth:
Arithmetic mean = (27.3 + 33.2 − 29.2 + 17.9)/4 = 49.2/4 = 12.3%
Equivalent annual growth rate = $[(19.04/13.43)^{0.25} - 1] \times 100 = 9.1\%$

The claim that the company has delivered growth every year in dividends, earnings and ordinary share price (apart from 20X2), is largely borne out by the above figures, with a couple of exceptions. No growth in real dividends occurred in 20X3, and the company's share price fell by 16.3% in 20X4. In fact, the statement should try to explain the reasons for the decline in share price in order to reassure shareholders, rather than gloss over it.

The statement also claims that RZP Co has consistently delivered above-average performance. Without information on sector averages for individual years, it is not possible to comment authoritatively here. The average growth rates for the sector cannot be used to comment on performance in individual years. If the company has consistently delivered above-average performance, however, the company's average annual growth rates should be greater than the sector averages.

Comparison of growth rates:

	Arithmetic mean	Equivalent annual rate	Sector
Nominal dividends	13.9%	13.3%	10%
Real dividends	9.7%	9.0%	9%
Earnings per share	12.3%	9.1%	10%
Share price	24.3%	19.7%	20%

If the sector average growth rates are arithmetic mean growth rates, the chairman's statement is technically correct. The basis on which the sector average growth rates have been prepared should therefore be clarified, in order to determine whether the chairman's statement is correct. Overall however, the company looks to be performing in line with the sector average, whatever method of calculation is used.

(b) The dividend yield and capital growth for 20X4 are calculated by reference to the 20X3 end-of-year share price.

The dividend yield is 0.56% (100 × 2.8/500.8) and the capital growth is –16.35% (100 × (418.9 – 500.8)/500.8). The total shareholder return is therefore –15.8% (0.56 – 16.35).

This negative total shareholder return conflicts with the chairman's claim to have delivered growth in dividends and share price in 20X4. Share prices may be affected by other factors than corporate activity, however, and it is possible that the negative return may represent a good performance when compared to the sector as a whole.

(c) The objectives of managers may conflict with the objectives of shareholders, so management remuneration package are often designed to **encourage goal congruence**. It is also interesting to note that in recent years there has been a tendency to remove managerial remuneration packages from the control of the very managers who benefit. **Remuneration committees** exist in listed companies aim to reduce managerial self-interest and encourage remuneration packages that support the achievement of shareholder wealth rather than purely managerial goals.

Packages need to motivate managers while supporting the achievement of shareholder wealth maximisation. The following factors need to be considered.

Performance measure

The managerial performance measure selected for use in the remuneration package should support the achievement of the primary objective of shareholder wealth maximisation. It could be linked to share price changes or **total shareholder return**.

The managerial performance measure should relate to factors under a manager's **control**. For example, if some items on a division's profit statement are not controlled by a divisional manager (eg head office overheads), these items should be excluded from the performance measure.

Performance measures should include **non-financial** measures (eg market share, defect levels, customer satisfaction). If they do not, managers may resort to short-term cost cutting measures to achieve profit targets. The managerial performance measure might be linked to industry best practice.

Type of reward

A **cash bonus** will be a powerful incentive for managers to improve their performance and achieve targets. However, most companies will also want their senior managers to have a **direct incentive** to **increase** the

share price of the company. **Share options** can be used but they can encourage **risk-taking**. Risky investments can dramatically increase the share price if successful but the managers will not suffer a loss on the share options if they fail.

Management remuneration packages for RZP Co

RZP Co has delivered earnings growth of more than 20% in both 20X3 and 20X4. If annual earnings growth were to be part of a remuneration package for RZP Co, earnings growth should be compared to the sector, and any bonus made conditional upon long term performance.

Alternatively, remuneration packages may be based on a performance measure linked to stock market performance, such as total shareholder return compared to average share price growth for the sector, or compared to growth in a stock market index. This would be consistent with shareholder wealth maximisation, and is likely to work well if the managers were to received shares or share options as part of the remuneration package. However, factors such as general economic changes or market conditions can have an effect on share prices, and so managers may fail to be rewarded when circumstances are beyond their control.

3 Tagna

> **Text references.** The financial management environment is covered in Chapter 2.
>
> **Top tips.** You should answer this well provided you read the question and are guided by what the examiner wants. In part (a) he wants a specific discussion on the three areas outlined. In part (b), an explanation of the terms used and a comparison between the two. Part (c) requires a more precise and detailed commentary on monopoly.
>
> **Easy marks.** Any written element provided you know what you are writing about.
>
> **Examiner's comments.** Many answers to part (a) lacked depth of discussion but were generally on the right track. One common misconception was to confuse financing costs with operating costs. Most answers to part (b) correctly defined and discussed the concepts of economy, efficiency and effectiveness (input, process and output), and were able to provide good answers on maximising shareholder wealth. Even good answers failed to recognise that a company in the private sector might be able to pursue 'value for money' and 'shareholder wealth maximisation' at the same time. Part (c) on the economic problems caused by monopoly and the role of government in maintaining competition was often answered well. There was a tendency to list points rather than discuss them, but the key aspects of the topic were usually identified. Good answers focused on the need to monitor markets and to have in place appropriate and effective legislation.

Marking scheme

			Marks
(a)	Up to 2 marks for each detailed consequence		10
(b)	Value for money	3	
	Maximisation of shareholder wealth	3	
			6
(c)	Meaning of monopoly	1	
	Discussion of economic problems of monopoly	5	
	Discussion of role of government	3	
			9
			25

(a) (i) If interest rates increase significantly, it is likely to have an adverse impact on Tagna's sales. As it sells luxury goods, it could be expected that these would be the first to be sacrificed by consumers if they are feeling 'the pinch' in other areas (such as mortgage payments) and their disposable income

is reduced. The cost of consumer credit might also be pushed up to dampen spending, further denting consumer confidence and the willingness to spend money on luxury items.

(ii)   Interest rates may also push up input costs such as materials and labour, although this would probably not be seen as immediately as an effect of higher interest rates upon sales, as the effect of the rise would have to make itself felt throughout the economy. Wages could go up as a result of inflation, but this will be countered by the effect of the interest rate increase on consumer demand.

(iii)   Profit after tax will fall as a result of the interest rate increase, both for the reasons outlined above but also because the cost of servicing Tagna's overdraft will increase. With a fall in sales, increased operating costs and increased interest charges, there is likely to be a significant fall in earnings. As Tagna's profits have been low, this could represent a real threat to future profitability and dividend payments.

(b)   Public sector organisations are generally set up with a prime objective which is not related to making profits. These organisations exist to pursue non-financial aims, such as providing a service to the community. However, there will be financial constraints which limit what any such organisation can do. A not-for-profit organisation **needs finance** to pay for its operations, and the major financial constraint is the amount of funds that it can obtain. Having obtained funds, a not-for-profit organisation should seek to get **value for money** from use of the funds:

(i)   **Economy**: not spending $2 when the same thing can be bought for $1
(ii)   **Efficiency**: getting the best use out of what money is spent on
(iii)   **Effectiveness**: spending funds so as to achieve the organisation's objectives

Since managing government (for example) is different from managing a company, a different framework is needed for **planning and control**. This is achieved by:

- setting **objectives** for each
- **careful planning** of public expenditure proposals
- emphasis on getting **value for money**

A private sector organisation has as its primary objective the making of sufficient profits to provide a satisfactory return for its owners and to keep the business operating.

So, it is job of senior management to **maximise the market value** of the company. Specifically, the main financial objective of a company should be to maximise the wealth of its ordinary shareholders. Within this context, the financial manager seeks to ensure that investments earn a **return**, for the benefit of shareholders. Part of this job will involve attracting funds from the market, such as new investors, but as with public sector organisations it is also important that the operations of the company are run economically and efficiently.

(c)   Regulation can be defined as any form of state interference with the operation of the free market. This could involve regulating demand, supply, price, profit, quantity, quality, entry, exit, information, technology, or any other aspect of production and consumption in the market.

An important role for the government is the regulation of markets when these fail to bring about an efficient use of resources. In response to the existence of market failure, and as an alternative to taxation and public provision of production, the state often resorts to regulating economic activity. Where one company's large share or complete domination of the market is leading to inefficiency or excessive profits, the state may intervene, for example through controls on prices or profits, in order to try to reduce the effects of this power. Abuse of a dominant position will cause economic problems and economic inefficiency, because there will be no incentive for the company to improve its processes or cut its costs, as it can pass on all inefficiencies to customers in the form of higher prices.

In a pure **monopoly**, there is only one firm, the sole producer of a good, which has no closely competing substitutes. In practice government policy is concerned not just with situations where one firm has a 100% market share, but other situations where an organisation has a significant market share. In the UK, a monopoly is said to occur if an organisation controls 25% or more of the market. The Office of Fair Trading and the Competition Commission monitor the market.

The Competition Commission can be asked to investigate what could be called 'oligopoly situations' involving explicit or implicit collusion between firms. The Commission must decide whether or not any

monopoly is acting 'against the public interest. In its report, the Commission will say if a monopoly situation has been found to exist and, if so, will make recommendations to deal with it. These may involve various measures.

- Price cuts
- Price and profit controls
- Removal of entry barriers

4 Phoenix

Text references. Performance analysis is covered in Chapter 1, working capital ratios in Chapter 4 and financial intermediation in Chapter 2.

Top tips. Do not spend too long on the ratios in part (a) at the expense of the written sections. The key to this question is why the entity is running out of cash.

In part (b) make sure you relate your answer to the bank in the scenario, do not just write everything you know about the risk/return trade-off. As we have said in the Passing F9 section of the front pages of this kit, make sure your answers are focused and specific to the organisation in the question.

In (c), note who are classified as financial intermediaries; they are not the same as independent financial advisers.

(a) **Accounting ratios**

		20X7	20X8	20X9
1	*Profit margin*			

$$\frac{\text{Profit before interest}}{\text{Revenue}} \times 100\%$$

$$\frac{(50+45)}{1{,}850} \times 100\% \qquad \frac{(60+60)}{2{,}200} \times 100\% \qquad \frac{(50+90)}{2{,}500} \times 100\%$$

$$= 5.1\% \qquad\qquad = 5.5\% \qquad\qquad = 5.6\%$$

2   *Operating costs*

$$\frac{\text{Other operating costs}}{\text{Revenue}} \times 100\%$$

$$\frac{550}{1{,}850} \times 100\% \qquad \frac{640}{2{,}200} \times 100\% \qquad \frac{700}{2{,}500} \times 100\%$$

$$= 29.7\% \qquad\qquad = 29.1\% \qquad\qquad = 28.0\%$$

3   *Inventory turnover*

$$\frac{\text{Cost of sales}}{\text{Inventory}}$$

$$\frac{1{,}250}{400} \qquad\qquad \frac{1{,}500}{540} \qquad\qquad \frac{1{,}750}{620}$$

$$= 3.1 \text{ times} \qquad = 2.8 \text{ times} \qquad = 2.8 \text{ times}$$

4   *Trade receivables turnover*

$$\frac{\text{Trade receivables}}{\text{Credit sales}} \times 365$$

$$\frac{492}{(300+45)} \times 365 \qquad \frac{550}{(400+60)} \times 365 \qquad \frac{633}{(600+90)} \times 365$$

$$= 521 \text{ days} \qquad\qquad = 436 \text{ days} \qquad\qquad = 335 \text{ days}$$

(*Note:* Interest from credit sales has been added, as this is likely to be included in the trade receivables figure)

5 *Cash generated from operations*	20X8	20X9
	$m	$m
Profit before interest	120	140
Depreciation	60	70
Increase in inventory	(140)	(80)
Increase in trade receivables	(58)	(83)
Increase in trade payables	–	10
	(18)	57

6   *ROCE*

	20X7	20X8	20X9

$$\frac{\text{Profit before interest}}{\text{Net assets} + \text{borrowings}} \times 100\%$$

	$\frac{95}{(372+520)} \times 100\%$	$\frac{120}{(382+720)} \times 100\%$	$\frac{140}{(372+930)} \times 100\%$
	= 10.7%	= 11.0%	= 10.8%

7   *Interest cover*

$$\frac{\text{Profit before interest}}{\text{Interest payable}}$$

	$\frac{95}{25} = 3.8$	$\frac{120}{60} = 2.0$	$\frac{140}{110} = 1.3$

8   *Gearing*

$$\frac{\text{Borrowings}}{\text{Net assets} + \text{borrowings}}$$

	$\frac{520}{892} = 58.3\%$	$\frac{720}{1,102} = 65.3\%$	$\frac{930}{1,302} = 71.4\%$

9   *Asset turnover*

$$\frac{\text{Revenue}}{\text{Net assets} + \text{borrowings}}$$

	$\frac{1,850}{892} = 2.1$	$\frac{2,200}{1,102} = 2.1$	$\frac{2,500}{1,302} = 1.92$

Bank lending

The main reason for the steep increase in bank lending is due to the entity not generating **sufficient cash** from its operating activities over the past three years.

For the year ended 30 June 20X8, the entity had a **net cash deficiency** on operating activities of $18m.

In addition, for at least the past two years, the cash generated from operating activities has not been sufficient to cover **interest payable**. Therefore those payments, together with tax and dividends, have had to be covered by borrowings.

As at 30 June 20X9, bank borrowings were $610m out of a total facility of $630m. Payment of the proposed dividends alone would increase the borrowings to the limit.

Operating review

Although **revenue** has been rising steadily over the period**, operating profit** has remained almost static.

Over this period the **profit margin** has risen, but not as much as would be expected. The **cost of sales** have risen in almost the same proportion as revenue. This may be due to increased costs of raw materials, as inventories have risen steeply; but the **turnover of inventory** has been falling or static over the same period.

There has also been a large increase in **trade receivables**. Both the increase in inventories and trade receivables have had to be financed out of operating activities leading to the present pressure on borrowings.

Although the number of days sales in trade receivables has fallen steadily over the period, the trade receivables at the end of June 20X9 still represent nearly a year's credit sales. This is excessive and seems to imply **a poor credit control policy**, even taking into account the extended credit terms being granted by the company.

Recommendations

The entity needs to undertake an urgent review of its **credit terms** in order to reduce the levels of trade receivables.

Inventory levels are also extremely high (representing over four months' sales) and should be reviewed.

Operating costs also need to be kept under control in order to generate more cash from sales.

(b) **The risk/return trade-off**

There is a **trade-off** between **risk and return**. Investors in riskier assets expect to be compensated for the risk. In the case of ordinary shares, investors hope to achieve their return in the form of an increase in the share price (a capital gain) as well as from dividends. In general, the **higher the risk** of the security, the **more important is the capital gain** component of the expected yield.

In the same way, **higher-risk borrowers** must **pay higher yields** on their borrowing to compensate lenders for the greater risk involved. Banks will assess the creditworthiness of the borrower and set a rate of interest on its loan at a certain mark-up above its base rate. The higher the risk, the higher the interest rate.

Phoenix has become an increasingly risky prospect and, if the bank can be persuaded to increase the lending facility, it is likely that the rate of interest charged will be increased.

(c) **The role of financial intermediaries**

A financial intermediary is an institution that links lenders with borrowers, by obtaining deposits from lenders and then re-lending them to borrowers. In the UK, the intermediaries include:

- Commercial banks
- Finance houses
- Building societies
- National Savings Bank
- Insurance companies
- Pension funds
- Unit trust companies
- Investment trust companies

Benefits of financial intermediation

(i) **Reduction of risk through pooling**

Since financial intermediaries lend to a large number of individuals and organisations, any losses suffered through default by borrowers or through capital losses are effectively pooled and borne as costs by the intermediary. Provided that the intermediary is itself financially sound, the lender should not run the risk of losing his investment. Bad debts are borne by the financial intermediary in its re-lending operation.

(ii) **Maturity transformation**

An example of this is the building society, which allows depositors to have immediate access to their savings while lending to mortgage holders for 25 years. The intermediary takes advantage of the continual turnover of cash between borrowers and investors to achieve this.

(iii) **Convenience**

They provide a simple way for the lender to invest, without him having personally to find a suitable borrower directly. All the investor has to decide is for how long the money is to be deposited and what sort of return is required; all he then has to do is to choose an appropriate intermediary and form of deposit.

(iv) **Regulation**

There is a comprehensive system of regulation in place in the financial markets that is aimed at protecting the investor against negligence or malpractice.

(v) **Information**

Intermediaries can offer a wide range of specialist expert advice on the various investment opportunities that is not directly available to the private investor.

Benefits of financial intermediaries

Financial intermediaries therefore have many benefits to offer the private investor, both in terms of general information and the investments available.

5 East Meets West Co

(a) Cost of sales = 5,600,000 × (100 − 25)%
     = $4,200,000

Purchases = 4,200,000 × 50%
     = $2,100,000

		Days
Raw material inventory period	$\dfrac{\text{Raw materials}}{\text{Purchases}} \times 365$	
	$\dfrac{220,000}{2,100,000} \times 365$	38.2
Credit taken from suppliers	$\dfrac{\text{Payables}}{\text{Purchases}} \times 365$	
	$\dfrac{210,000}{2,100,000} \times 365$	(36.5)
Work in progress	$\dfrac{\text{Work in progress}}{\text{Cost of sales}} \times 365$	
	$\dfrac{550,000}{4,200,000} \times 365$	47.8
Finished goods	$\dfrac{\text{Finished goods}}{\text{Cost of sales}} \times 365$	
	$\dfrac{350,000}{4,200,000} \times 365$	30.4
Credit allowed to receivables	$\dfrac{\text{Receivables}}{\text{Sales}} \times 365$	
	$\dfrac{506,000}{5,600,000} \times 365$	33.0
		112.9

(b) The cash operating cycle can be reduced in the following ways

   (i) **Reduce raw material inventory**
        Arrangements can be made with suppliers so raw materials are only ordered when they are needed for production.

   (ii) **Credit taken from suppliers**
        East Meets West could negotiate a **longer credit period** from suppliers.

   (iii) **Reduce work-in-progress**
        Work-in-progress might be reduced by using **more advanced technology** or improving **production processes.**

(iv) **Reduce finished goods inventory**

Finished goods inventory could be reduced by not holding as much **safety inventory** to guard against unexpected demands.

(v) **Reduce receivables**

Credit control procedures could be **tightened**, or incentives such as discounts be offered for early payment.

(c) (i) **Working capital**

The net working capital of a business can be defined as its current assets less its current liabilities. The management of working capital is concerned with ensuring that **sufficient liquid resources** are maintained within the business. For the majority of businesses, particularly manufacturing businesses, trade payables will form the major part of the current liabilities figure, and will be a significant element in the make-up of the working capital balance.

Trade credit period

It follows that the trade credit period taken will be a major determinant of the working capital requirement of the company. This is calculated (in days) as the total value of trade payables divided by the level of credit purchases times 365. The actual length of the period will depend partly on the credit terms offered by suppliers and partly on the decisions made by the company. For example, the company may choose to negotiate longer terms with its suppliers although this may be at the expense of any available settlement discounts.

Cash conversion cycle

A link can be made between working capital and liquidity by means of the **cash conversion cycle**. This measures the length of time that elapses between a firm paying for its various purchases and receiving payment for its sales. It can be calculated as the receivable days plus the inventory holding period less the trade credit period, and it measures the length of time for which net current assets must be financed.

This emphasises the important role of the trade credit period in the overall liquidity of the company.

(ii) **Importance of trade payables**

For many firms, trade payables provide a very important source of short-term credit. Since very few companies currently impose interest charges on overdue accounts, taking extended credit can appear to be a very cheap form of short-term finance. However, such a policy entails some risks and costs that are not immediately apparent, as follows.

(1) If discounts are being forgone, the **effective cost** of this should be evaluated – it may be more beneficial to shorten the credit period and take the discounts.

(2) If the company gains a reputation for slow payment this will **damage its credit references** and it may find it difficult to obtain credit from new suppliers in the future.

(3) Suppliers who are having to wait for their money may seek recompense in other ways, for example by raising prices or by placing a lower priority on new orders. Such actions could do **damage** to both the **efficiency and profitability** of the company.

(4) Suppliers may place the company **'on stop'** until the account is paid. This can jeopardise supplies of essential raw materials which in turn could cause production to stop: this will obviously provide the company with a high level of unwanted costs.

(d) **Problems with inflation**

(i) **Increase in raw material prices**

The **raw material prices** that a business faces may increase, but the business may not be able to pass these increases on to its customers in the form of higher prices for its finished goods.

(ii)   **Uncertainty**

Inflation may lead to **economic uncertainty**, which decreases the demand for consumer goods. Increased uncertainty will also mean that **business decision-making** becomes more difficult. Businesses also have to **expend resources** keeping track of price changes.

(iii)   **Higher interest rates**

Governments or the central bank may counter inflation by raising interest rates, and this will make the cost of borrowing for businesses more expensive and **limit their** opportunities to invest.

(iv)   **Decreased overseas demand**

If a business in Pernisia has to raise its prices because it **faces increased costs**, it may come under increasing pressure from overseas competitors who do not face the same price increases.

(v)   **Change in the value of debt**

Payables will be disadvantaged by inflation, as it will mean a **fall in the real value of debt**, although receivables will be advantaged for the same reason.

6 JIT and EOQ

> **Text references.** Inventory management is covered in Chapter 5.
>
> **Top tips.** It is easy to go off on the wrong track when answering (a). Make quite sure you know what you are going to do before you start! Don't forget you are asking for the effect on *profit*, not cash flow. The effect of the investment in equipment is shown as the sum of interest cost and depreciation.
>
> Remember also that the reduced receivable payment period will be on an increased sales value.
>
> In (b), it is the company's perspective you are concerned with, not its customers'.
>
> In (c) we use the annuity factor to discount the cash flow. Don't forget the tax. You may not have covered this part of the syllabus yet so just read through the answers for now.

(a)   **Improvement in first year profit before tax attributable to the JIT agreement**

		$'000	$'000
Equipment: interest cost	13% × $0.5m		(65.00)
depreciation cost	$0.5m/5		(100.00)
Main customer:			
Original value of annual sales	20% × $20m	4,000.00	
Increased value of annual sales	1.05 × $4m	4,200.00	
Increase in sales			200.00
Original receivables	90/365 × $4m	986.30	
Revised receivables	60/365 × $4.2m	690.41	
Reduction in receivables		295.89	
Annual interest saving from reduction in receivables	13% × 295.89		38.47
Penalty payment for default	10% × $4.2m	420	
Expected value of penalty	5% × $420,000		(21.00)
Net benefit to year 1 profits			52.47

The **JIT arrangement** appears to be worthwhile in expected value terms.

Other considerations

However, the expected value figure conceals the risk of adverse results if the company fails to meet delivery guarantees: the 'worst case' scenario in one year is that a penalty of $420,000 is payable (more than 5% of operating profit). The directors should make sure that the company is insured against all the normal risks outside its direct control (eg fire, theft, flood) and also invest in a total quality programme to underpin the JIT arrangement by eliminating any defective output.

(b) **Other benefits from the JIT agreement**

Closer relationship between organisations

The Just in Time arrangement with its major customer will promote a closer relationship between the two organisations. This will lower PS's **medium term operating risk** and enable it to plan its own materials requirements, although in the short term the company must be prepared to be very flexible in its delivery procedures. It may also result in PS entering into JIT arrangements with its own suppliers. The strengthened link between the companies may result in further co-operation in other fields (eg design of new products).

Just in time and total quality

A **Just in Time arrangement** with a customer works best when the company uses a **Total Quality** approach to eliminate defective products from its output. The growing reputation for 'zero defectives' is an advantage of implementing the system effectively. This growing reputation will boost PS's sales and enable it to negotiate JIT arrangements with other customers.

(c) (i) The **Economic Order Quantity (EOQ)** can be found as follows.

$$\text{EOQ} = \sqrt{\frac{2 \times \text{demand (units)} \times \text{ordering cost}}{\text{holding cost}}}$$

Before reorganisation

Demand = 40,000 units per annum
Ordering cost = $100 per order
Holding cost = 20% × $2.50

$$\text{EOQ} = \sqrt{\frac{2 \times 40,000 \times 100}{0.2 \times 2.50}}$$

$$\text{EOQ} = \sqrt{16,000,000} = 4,000 \text{ units}$$

After reorganisation

Demand = 40,000 units per annum
Ordering cost = $25 per order
Holding cost = 20% × $2.50

$$\text{EOQ} = \sqrt{\frac{2 \times 40,000 \times 25}{0.2 \times 2.50}}$$

$$\text{EOQ} = \sqrt{4,000,000} = 2,000 \text{ units}$$

(ii) Implementation of the new system will affect both the total ordering costs per annum and the inventory holding cost. **Under the existing system** these costs are as follows.

Ordering cost

	$
EOQ is 4,000 units; demand is 40,000 units.	
Number of orders per year is therefore 10.	
Cost per order is $100.	
Total ordering cost per annum ($100 × 10) =	1,000

Carrying cost

	$
EOQ is 4,000 units.	
Average inventory is therefore 2,000 units.	
Cost is 2,000 × $2.50 × 20% =	1,000
Total annual cost	**2,000**

Under the proposed system the costs would become as follows.

Ordering cost

	$
EOQ is 2,000 units; demand is 40,000 units.	
Number of orders per year is therefore 20. Cost per order is $25.	
Total ordering cost per annum ($25 × 20) =	500

Carrying cost

EOQ is 2,000 units. Average inventory is therefore 1,000 units.	
Cost is 1,000 × $2.50 × 20%	500
Total annual cost	1,000

The **annual cost saving** is therefore $1,000 ($2,000 − $1,000). This will give rise to an **after tax cash flow** of $700 ($1,000 × (1 − 0.3)). The cash flows can now be **discounted** at the cost of finance of 12%. It is **assumed** that tax is payable in the year in which it arises, and that the reorganisation costs are fully tax allowable.

		$
Year 0	$4,000 × (1 − 0.3) × 1.000 =	(2,800.00)
Years 1-8	$700 × 4.968 =	3,477.60
NPV of reorganisation		677.60

7 TNG Co

Text references. Inventory management is covered in Chapter 5.

Top tips. This question is made up of five smaller parts. Part (e) is written and could be answered separately to the other parts. You could do this part first as long as you leave space in your answer book.

Easy marks. Using the EOQ model to calculate the requirements of part (b).

Examiner's comments. Many candidates who attempted this question gained high marks. Part (a) asked for a calculation of the cost of the current ordering policy of a company. Three costs were needed: the cost of ordering inventory, the annual cost of the buffer inventory held, and the annual cost of additional inventory equal to half of the order size. A common problem was an inability to calculate the cost of holding inventory, the most common error being including buffer inventory but omitting half of the order size, or vice versa. Most answers calculated the annual ordering cost correctly.

Candidates were asked in part (b) to calculate the economic order quantity (the formula for this was provided in the formulae sheet), and the annual saving if an EOQ-based optimal ordering policy were used rather than the current policy. Answers were often of an acceptable standard, although tending to show similar errors to those found in part (a). Most answers were able to calculate correctly the economic order quantity, allowing for errors carried forward from part (a).

Part (c) asked for an evaluation of whether a discount offered by a supplier was financially acceptable. Answers showed that there were many ways to prove that the offered discount was financially acceptable and many answers gained full credit.

The requirement in part (d) was to discuss the limitations of the economic order quantity model as a way of managing inventory. Many answers gained good marks by focusing on the limitations imposed by the assumptions underlying the model, such as constant demand, zero lead time, and constant ordering cost and holding cost.

A discussion of the advantages and disadvantages of using just-in-time inventory management methods was required in part (e) and many answers gained high marks, although there was a tendency to list brief points rather than offer the discussion that was asked for.

		Marks
(a)	Annual ordering cost	1
	Annual holding cost	2
	Annual cost of current policy	1
		4
(b)	Calculation of economic order quantity	1
	Annual ordering cost	1
	Annual holding cost	1
	Annual cost of EOQ policy	1
	Saving from using EOQ policy or discussion	1
		5
(c)	Analysis	2–3
	Discussion	1–2
	Maximum	4
(d)	Discussion of limitations of EOQ model	4
(e)	Advantages of JIT inventory management methods	4–5
	Disadvantages of JIT inventory management methods	4–5
	Maximum	8
		25

(a) Current order size = 50,000 units
Average number of orders per year = demand/order size = 255,380/50,000 = 5.11 orders
Annual ordering cost = 5.11 × $25 = $127.75
Buffer inventory held = 255,380 × 28/365 = 19,591 units
Average inventory held = 19,591 + (50,000/2) = 44,591 units
Annual holding cost = 44,591 × 0.1 = $4,459.10
Annual cost of current ordering policy = 4,459.10 + 127.75 = $4,587

(b) Economic order quantity:

$$EOQ = \sqrt{\frac{2 \times demand \times ordering\,cost}{holding\,cost}} = \sqrt{\frac{2 \times 255,380 \times 25}{0.1}}$$

= 11,300 units
Average number of orders per year = 255,380/11,300 = 22.6 orders
Annual ordering cost = 22.6 × $25 = $565.00
Average inventory held = 19,591 + (11,300/2) = 25,241 units
Annual holding cost = 25,241 × 0.1 = $2,524.10
Annual cost of EOQ ordering policy = 2,524.10 + 565.00 = $3,089
Saving compared to current policy = $4,587 – $3,089 = $1,498

(c) Annual credit purchases = 255,380 × $11 = $2,809,180
Current payables = $2,809,180 × 60/365 = $461,783
Payables if discount is taken = $2,809,180 × 20/365 = $153,928
Reduction in payables = $461,783 – $153,928 = $307,855
Finance cost increase = $307,855 × 8% = $24,628
Discount gained = $2,809,180 × 1% = $28,092
Net benefit of taking discount = $28,092 – $24,628 = $3,464
The discount is therefore financially worthwhile.

(d) Some businesses attempt to control inventories on a 'scientific' basis by balancing the costs of inventory shortages against those of inventory holding. The economic order quantity (EOQ) model can be used to decide the optimum order size for inventories which will minimise the costs of ordering inventories plus inventoryholding costs.

The calculation of EOQ is based upon a set formula which has two main inputs – holding cost and ordering cost, which must be known with certainty and which are assumed not to change. It is also assumed that demand is constant, the lead time is constant or zero and purchase costs per unit are constant (ie there are no bulk discounts). In practice, all of these assumptions are likely to be unrealistic – costs are going to vary and demand will never be constant.

(e)   Some manufacturing companies have sought to reduce their inventories of raw materials and components to as low a level as possible. Just-in-time procurement and stockless production are terms which describe a policy of obtaining goods from suppliers at the latest possible time (ie when they are needed) and so avoiding the need to carry any materials or components inventory.

Introducing just-in-time (JIT) inventory management methods have been said to deliver the following potential benefits.

- Reduction in inventory holding costs
- Reduced manufacturing lead times
- Improved labour productivity
- Reduced scrap/rework/warranty costs – improved quality
- Price reductions on purchased materials
- Reduction in the number of accounting transactions
- Stronger relationship between buyer and supplier

Reduced inventory levels mean that a lower level of investment in working capital will be required.

JIT will not be appropriate in some cases. For example, a restaurant might find it preferable to use the traditional economic order quantity approach for staple non-perishable food inventories, but adopt JIT for perishable and 'exotic' items. In a hospital, a stock-out could quite literally be fatal and so JIT would be quite unsuitable. There is little room for error in such a system, so if there are likely to be supplier delays or variable delivery times that could have disastrous consequences, then JIT is not suitable. The system also makes the buyer heavily dependent on the supplier for both delivery and quality of supply.

8 PNP Co

Text references. Managing working capital is covered in Chapter 5 and forward market hedging in Chapter 19.

Top tips. Make sure you show your workings clearly in part (a) as there are various correct approaches you could take regarding bad debts and payment periods. You will find this question time-pressured so aim to gain as many of the easy marks as possible rather than aim for a perfect answer.

Part (d) requires a full explanation and your suggestions must be suitable for this company so, as we say in the passing F9 section of the front pages, don't just simply write a list of points learnt from a textbook.

Easy marks. Part (b) should be a very straightforward calculation of standard liquidity ratios. If you have learnt the subject matter part (d), it should be a straightforward explanation.

Marking scheme

			Marks
(a)	Increased contribution	1	
	Decrease in bad debts	1	
	Increase in current Class 1 discount	1	
	Discount from transferring Class 2 debtors	1	
	Discount from new Class 1 debtors	1	
	Increase in bad debts	1	
	Increase in financing cost	2	
	Net benefit of proposal	1	
	Comment	1	
	Maximum		9

(b)	Current cash operating cycle	2	
	Revised cash operating cycle	2	
			4
(c)	Current dollar value of overseas debtors	1	
	Forward sterling value of overseas debtor	1	
			2
(d)	Credit policy	2-3	
	Credit assessment	2-3	
	Credit control	2-3	
	Collection of amounts due	2-3	
	Overseas debtors	2-3	
	Maximum		10
			25

(a) **Evaluation of proposal**

Workings

Contribution: sales ratio = (5,242 – 3,145)/5,242 × 100 = 40%
Bad debts ratio for Class 2 receivables = 12,600/252,000 × 100 = 5%
Increase in Class 1 receivables from new business = 250,000 × 30/365 = £20,548
Increase in Class 2 receivables from new business = 250,000 × 60/365 = £41,096
Current sales of Class 1 receivables = 200,000 × 365/30 = £2,433,333
Current sales of Class 2 receivables = 252,000 × 365/60 = £1,533,000

	£	£
Benefits		
Increased contribution (500,000 × 40%)	200,000	
Decrease in bad debts (12,600 × 0.5)	6,300	
		206,300
Costs		
Increase in Class 1 discount (2,433,333 × 0.5%)	12,167	
Discount cost of transferring Class 2 receivables (1,533,000 × 50% × 1.5%)	11,498	
Discount cost of new Class 1 receivables (250,000 × 1.5%)	3,750	
Increase in bad debts from new Class 2 receivables (41,096 × 5%)	2,055	
Increase in financing cost from new receivables ((20,548 + 41,096) × 8%)	4,932	
		34,402
Net benefit		171,898

The proposed change to the early payment discount is financially acceptable.

Some of the assumptions made concerning bad debts and payment periods may be debateable but the net benefit is sufficiently large to make a **favourable recommendation** anyway.

(b) **Current cash operating cycle**

Inventory days = 603/3,145 × 365 = 70 days
Payables days = 574.5/3,145 × 365 = 67 days
Receivables days = 744.5/5,242 × 365 = 52 days
Cash operating cycle = 70 + 52 – 67 = 55 days

Following the implementation of the increased discount for early payment, total receivables will increase by £61,644 (20,548 + 41,096) to £806,144 and turnover will have increased to £5,742,000. This results in a slight fall in receivable days to 51 days (806,144/5,742,000 x 365) and therefore a **slight fall** of one day in the cash operating cycle to **54 days**.

(c) Current sterling value of overseas receivables = £182,500

Current dollar value of overseas receivables = 182,500 × 1·7348 = $316,601

A **forward market hedge** (ie a forward exchange contract) will lock the sterling value of the receivables at the three-month forward rate.

Hedged sterling value of overseas receivables in three months = 316,601/1·7367 = £182,300

This is **less** than the current sterling value of the overseas receivables because sterling is expected to appreciate against the dollar.

(d)   There are four key areas of accounts receivable management.

(i)   **Formulation of policy**

A **framework** needs to be established within which the management of accounts receivable in PNP takes place. Elements of the framework to be considered include establishing the **terms of trade** such as the period of credit offered and **early settlement discounts.** PNP must also consider whether to **charge interest** on overdue accounts. Laid-down procedures will be needed for granting credit to new customers and determining what to do when accounts become overdue.

(ii)   **Assessment of creditworthiness**

Information relating to a new customer needs to be analysed. The information may come from bank references, trade references or credit reference agency reports.

The greater the amount of credit being granted and the possibility of repeat business, the more credit analysis is needed.

(iii)   **Credit control**

Accounts receivable' payment records must be **monitored** continually. This depends on successful sales ledger administration.

Credit monitoring can be simplified by a system of **in-house credit ratings**. For example, a company could have five credit-risk categories for its customers. These credit categories or ratings could be used to decide either individual credit limits for customers within that category or the frequency of the credit review. PNP uses a segmental analysis of its accounts receivable.

A **customer's payment record** and the **accounts receivable aged analysis** should be examined regularly, as a matter of course. Breaches of the credit limit, or attempted breaches of it, should be brought immediately to the attention of the credit controller.

(iv)   **Collection of amounts due**

PNP needs to have in place agreed procedures for dealing with overdue accounts. Examples include instituting reminders or final demands, chasing payment by telephone or making a personal approach. If this does not work, the company could refuse to grant any more credit to the customer, hire a specialist debt collecting agency or, as a last resort, take legal action.

The overall **debt collection policy** of the firm should be such that the administrative costs and other costs incurred in debt collection do not exceed the benefits from incurring those costs.

PNP needs to consider how **overseas receivables differ from domestic receivables** and set up specific policies for these customers. For example, they may take longer to pay and will need to be financed for longer. There is also the issue of **exchange rate risk** to be considered. The **credit risk** from overseas receivables can be reduced using advances against collection, requiring payment through bills of exchange, arranging documentary letters of credit or using export factoring.

9 Thorne Co

Text reference. Cash management is covered in Chapter 6.

Top tips. Use a proforma for the cash budget and show your workings clearly. Make sure your answers in the written sections relate specifically to the company in question.

Easy marks. There are lots of opportunities for gaining at least a couple of marks in each of the three shorter parts.

		Marks
(a)	Credit sales	2
	Cash sales	1
	Proceeds from asset disposal	1
	Salaries	1
	Bonus	1
	Expenses	1
	Fixed overheads	1
	Taxation and interest	1
	Closing balances	1
		10
(b)	Discussion of factors	5
(c)	Discussion of advantages and disadvantages	5
(d)	Discussion of Baumol model	2-3
	Discussion of applicability in this case	2-3
		5
		25

(a)   Cash budget

	Jan $'000	Feb $'000	March $'000	April $'000
Receipts				
Fee on sale (W1)	54	63	99	144
Receipt on sale of vehicles				20
	54	63	99	164
Payments				
Salaries	26.25	26.25	26.25	26.25
Bonus (W2)			6.3	12.6
Variable expenses (W3)	9	13.5	22.5	27
Fixed overheads	4.3	4.3	4.3	4.3
Interest on loan			3.0	
Tax liability				95.80
	39.55	44.05	62.35	165.95
Net cash flow	14.45	18.95	36.65	(1.95)
Balance b/fwd	(40.00)	(25.55)	(6.6)	30.05
Balance c/fwd	(25.55)	(6.6)	30.05	28.10

Working 1

	Jan	Feb	March	April
Receipts				
Unit sales	10	15	25	30
	$'000	$'000	$'000	$'000
Fee at 3% × $180,000 × numbers sold	54	81	135	162
Received				
– 1% in month of sale	18	27	45	54
– 2% in following month				
(January receipt relates to December sale)	36	36	54	90
	54	63	99	144

Working 2

	Jan	Feb	March	April
Receipts				
Unit sales	10	15	25	30
	$'000	$'000	$'000	$'000
Bonus based on numbers sold over 20	0	0		
$-$ $140 \times 9 \times$ numbers sold over 20	0	0	6.3	12.6

Working 3

	Jan	Feb	March	April
Receipts				
Unit sales	10	15	25	30
	$'000	$'000	$'000	$'000
Variable overheads at 0.5% × $180,000 × numbers sold	9	13.5	22.5	27

(b) **Factors to consider when investing any cash surplus**

The cash budget for Thorne Co shows an increase in sales over the period, which suggests higher sales as the spring approaches. However, the payment of tax in April meant that a trend of increasing net cash flows was temporarily reversed.

Thorne needs to consider the following when investing any surpluses:

(i) Short-term investments with no capital risk as these may be called upon at any time. Short-term investments include bank deposit accounts, certificates of deposit, term bills and gilts, which are short-dated.

In choosing between these, Thorne Co will consider the size of the surplus, the length of time it is available, the yield offered and the risk associated with each instrument.

(ii) On an annual basis, look at any surpluses and invest these in longer-term higher yield assets. The company will most probably call on these at some stage to fund expansion but needs to pick the investments carefully.

The investment of cash balances is part of the treasury function of a company. It is unlikely that Thorne Co is of a size to sustain a full time treasury activity but nonetheless there is a definite benefit in closely managing any surpluses.

(c) **Advantages and disadvantages of using overdraft finance to fund cash shortages**

Thorne Co has budgeted deficits in two of the months in the forecast. These are short term in nature so it is unlikely that a long-term loan will be required to fund these.

Typically, temporary deficits are funded by an **overdraft** granted by the company's bank where interest is charged on the overdrawn amount at a rate over base.

Advantages of overdraft finance include its flexibility and that interest is only due on the actual overdrawn amount. The rate of interest is flexible as it is variable and linked to a base rate and so can go down as well as up.

Disadvantages of overdraft finance include the risk of an interest rate increase as the rate is not fixed. Also, the overdraft is repayable on demand. Banks usually ask for some collateral when lending such as a fixed or floating charge on the company's assets.

(d) **The Baumol model and cash management**

A number of different cash management models indicate the **optimum amount of cash** that a company should hold. One such model is based on the idea that deciding on optimum cash balances is like deciding on optimum inventory levels, and suggests the optimum amount to be transferred regularly from investments to current account.

We can distinguish two types of cost which are involved in obtaining cash:

(i) The **fixed cost** represented, for example, by the issue cost of equity finance or the cost of negotiating an overdraft

(ii) The **variable cost** (opportunity cost) of keeping the money in the form of cash

The inventory approach has the following drawbacks for companies such as Thorne Co.

(i) In reality, it is unlikely to be **possible** to **predict amounts required** over future periods with much certainty.

(ii) No **buffer inventory** of cash is allowed for. There may be costs associated with running out of cash.

(iii) There may be other **normal costs** of holding cash, which increase with the average amount held.

(iv) It assumes **constant transaction costs** and **interest rates**.

10 Velm Co

Text references. Working capital management is covered in Chapters 4, 5 and 6.

Top tips. There isn't much to calculate here so just make sure you know your receivable days formula and think about the relationship between receivables and cash flow.

Most of the marks on this question are for a discussion of working capital in one form or another. So think about sources of finance and policies for managing working capital. The final part of the question does need you to think a bit more widely about cashflow and business policy.

Easy marks. Any of the discussion parts.

Examiner's comments. Part (a) was answered moderately well. Most candidates were able to identify the savings in bad debts and salary, and the cost of the discount, but the calculations of the reduced financing cost arising from the discount were often confused. In general, the approach taken by most candidates would have been improved if they had focused on the incremental costs and benefits. Good answers to part (b) on the relative merits of short and long-term finance for the financing of working capital discussed factors such as relative cost, availability, security and risk. Part (c) asked candidates to discuss the different policies that could be adopted towards the financing of working capital – a discussion of aggressive, conservative and matching policies was expected. Part (d) on working capital management was generally answered pretty well. There was a general tendency to mix up the answers to parts (b), (c) and (d).

Marking scheme

			Marks
(a)	Reduction in receivables	1	
	Cost of discount	1	
	Reduction in financing cost	1	
	Reduction in bad debts and salary saving	1	
	Calculation of net benefit and conclusion	1	
			5
(b)	Risks of short-term finance	2	
	Cost of short-term finance	1	
	Risks of long-term finance	1	
	Cost of long-term finance	1	
	Discussion and conclusion	1	
			6
(c)	Permanent and fluctuating current assets	2	
	Explanation of financing policies	4	
	Discussion and link to Velm Co	1	
			7

(d)	Advantages of working capital management	2
	Credit management	2
	Inventory management	2
	Discussion and link to Velm Co	1
		7
		25

(a) Receivables are currently taking on average ($550,000/$4,000,000) × 365 = 50 days to pay. This is in excess of Velm's stated terms. The discount, to be taken up by 2/3 of customers, will cost the company $4,000,000 × 1% × 2/3 = $26,667. It is stated that this will bring the receivables' payment period down to 26 days, which is represented by a new receivables level of ($4,000,000 – $26,667) × 26/365 = $283,000. This is a reduction in receivables of $267,000. At current overdraft costs of 9%, this would be a saving of $267,000 × 0.09 = $24,030.

Bad debts would decrease from 3% to 2.4% of turnover, which saves a total of $4,000,000 × 0.006 = $24,000. There would also be a salary saving from early retirement of $12,000.

So the net effect on Velm's profitability is as follows:

	$	
Saving on overdraft costs	24,030	
Decreased bad debts	24,000	
Salary saving	12,000	
Less: cost of discount	(26,667)	
	33,363	net saving

(b) Short-term sources of finance include overdrafts and short-term loans. Long-term sources of finance include loan notes and long-term loans. The choice is between cheaper but riskier short-term finance and more expensive but less risky long-term debt. A customer might ask the bank for a short term overdraft facility when the bank would wish to suggest a loan instead; alternatively, a customer might ask for a loan when an overdraft would be more appropriate.

In most cases, when a customer wants finance to help with **'day to day' trading** and cash flow needs, an overdraft would be the appropriate method of financing. The customer should not be short of cash all the time, and should expect to be in credit in some days, but in need of an overdraft on others.

When a customer wants to borrow from a bank for only a short period of time, even for the purchase of a major non-current asset such as an item of plant or machinery, an overdraft facility might be **more suitable** than a loan, because the customer will stop paying interest as soon as his account goes into credit.

However, when a customer wants to borrow from a bank, but cannot see his way to repaying the bank except over the course of a few years, the required financing is best catered for by the provision of a loan rather than an overdraft facility.

Advantages of an overdraft over a loan

(i) The customer **only pays interest when he is overdrawn**.

(ii) The bank has the flexibility to **review** the customer's overdraft facility periodically, and perhaps agree to additional facilities, or insist on a reduction in the facility.

(iii) An overdraft can do the same job as a **loan**: a facility can simply be renewed every time it comes up for review.

(iv) Being short-term debt, an overdraft will not affect the calculation of a company's **gearing**.

Bear in mind, however, that overdrafts are technically **repayable on demand**, so even though they are cheaper than longer term sources of debt finance, they are more risky.

Advantages of a long term loan

(i)   Both the customer and the bank know exactly what the repayments of the loan will be and how much interest is payable, and when. This makes planning (budgeting) simpler.

(ii)   The customer does not have to worry about the bank deciding to reduce or withdraw an overdraft facility before he is in a position to repay what is owed. There is an element of 'security' or 'peace of mind' in being able to arrange a loan for an agreed term. However, long term finance is generally more expensive than short term finance.

(iii)   Loans normally carry a facility letter setting out the precise terms of the agreement.

Working capital policies can be characterised as **conservative**, **moderate** and **aggressive**. A conservative policy would finance working capital needs primarily from long term sources of finance, so all long term assets and some fluctuating current assets. However, Velm Co is following an aggressive financing policy as long term debt only makes up 2.75% (40/1,450) of non-cash current assets and most finance is provided by short term debt ($1,530k).

(c)   As a general rule, assets which yield profits over a long period of time should be financed by long-term funds. This is an application of the **matching principle**.

In this way, the returns made by the asset will be sufficient to pay either the interest cost of the loans raised to buy it, or dividends on its equity funding.

If, however a long-term asset is financed by short-term funds, the company cannot be certain that when the loan becomes repayable, it will have enough cash (from profits) to repay it.

Under a moderate or matching approach, a company would normally finance short-term assets partly with short-term funding and partly with long-term funding. However, Velm appears to be conducting an aggressive financing policy, as short term finance is being used for most of its current assets. This is a higher risk source of finance.

(d)   Every business needs adequate **liquid resources** to maintain day-to-day cash flow. It needs enough to pay wages and salaries as they fall due and enough to pay payables if it is to keep its workforce and ensure its supplies.

Maintaining adequate working capital is not just important in the **short term**. Sufficient liquidity must be maintained in order to ensure the **survival of the business** in the long term as well. Even a profitable company may fail if it does not have adequate cash flow to meet its liabilities as they fall due.

On the other hand, an excessively conservative approach to working capital management resulting in **high levels of cash holdings** will harm profits because the opportunity to make a return on the assets tied up as cash will have been missed.

If the turnover periods for inventories and receivables lengthen, or the payment period to payables shortens, then the **operating cycle** will lengthen and the investment in working capital will have to increase. This will increase costs (and decrease shareholder wealth) so it is important that receivables are properly managed and chased up, inventory is maintained at optimum levels (perhaps using the economic order quantity model), and full advantage is taken of suppliers' credit terms.

Since a company must have adequate cash inflows to survive, management should plan and control cash flows as well as profitability. **Cash budgeting** is an important element in short-term cash flow planning. If a budget reveals that a short-term cash shortage can be expected, steps will be taken to meet the problem (perhaps by arranging a bigger bank overdraft facility).

In summary, **working capital management** seeks to improve cash flows by reducing inventories and receivables, taking more credit, or even negotiating a higher bank overdraft facility.

11 PCB Co

> **Text references.** Working capital management is covered in Chapters 4, 5 and 6.
>
> **Top tips.** This question requires an understanding of working capital and the causes and consequences of overtrading. There is plenty of information available in the example that you will find helpful to analyse and incorporate in your answer, in order to provide a good illustration of the points that you make.
>
> The symptoms in (a) are common signs which you will often see in questions on overtrading. The basic point is that increased activity requires more cash to pay for increased assets (fixed and current), and greater levels of expenditure. Ideally the cash should come from long-term sources (shareholders and long-term lenders), but short-term sources (bank overdraft) will have to be used if long-term sources are not available. The result is the lack of matching described in (c).
>
> (b) is all about using the other information given in the question to come up with reasons for the change in the profit figures.
>
> Note in (c) that the company is in a precarious position, needing more finance (preferably long-term), but will find it difficult to obtain more finance because it is in a precarious position. Even if the interest burden can be sustained, it may be at the expense of shareholders' income.
>
> In (d) you need to consider both sides of the problem, whether and how the growth in non-cash assets and expenditure can be controlled, and possible internal and external sources of finance obtained. PCB is the sort of company in which venture capitalists often invest, but venture capitalists must be convinced that PCB is a worthwhile investment.

(a)   Manufacturing companies generally have a relatively **long operating cycle** and a correspondingly large working capital requirement. When the level of sales increases, there is an increased investment in:

   (i)   **Inventory**, as additional raw materials are purchased to produce the additional goods.

   (ii)   **Staff costs**, both direct in production, and indirect in sales and credit control overhead.

   (iii)   **Receivables** since most manufacturing companies sell on credit, and additional sales will therefore translate into a higher level of receivables.

   Need for working capital investment

   The company may also need to purchase equipment to increase its capacity. All of these areas require an immediate investment of cash, in advance of the cash flow benefits of the additional sales and operating profits being felt. Although the company may also benefit from an increased level of payables, this will not be enough to offset the other factors, and therefore additional cash will be required to finance this process.

   Problems of PCB

   This problem can be illustrated using PCB as an example.

   (i)   During the last year, **sales** have **increased** by $1.3m from $1.7m to $3m, an increase of 76%.

   (ii)   There has been **additional investment** of $44,000 in **non-current assets** during the same period.

   (iii)   The **level of inventory** has **more than doubled** from $95,000 to $220,000.

   (iv)   **Receivables** have **increased** by $102,000 from $108,000 to $210,000, an increase of 94%.

   (v)   **Six additional sales** staff have been **recruited**.

   (vi)   This has resulted in a **massive increase** in the **bank overdraft** of $116,750 from $41,250 to $158,000, and in the level of trade payables, which has increased by nearly 150% from $82,500 to $205,000.

   The cash resources at the start of the year were only $1,750, and the increased level of trading has been financed entirely from short-term bank borrowings and trade payables.

(b)   The change in the trading position has been as follows.

	Y/e 30.11.X8		Y/e 30.11.X7		Change
Sales	3,000,000		1,700,000		+76%
Gross profit	450,000	15%	330,000	19%	+36%
Net profit before tax	60,000	2%	82,000	5%	–27%

Both gross and net margins have fallen. Contributory factors are likely to include the following.

(i)   **Selling prices may have been reduced** to achieve the increase in sales. This will result in depressed gross margins.

(ii)   The additional investment in non-current assets will have led to an **increase in the depreciation charge**.

(iii) **Interest costs will have increased** due to the higher level of bank borrowings.

(iv)   **Staff costs will have increased** because of the larger number of sales staff now employed.

(c)   **Increase in debt levels**

It has been seen that there has been a large increase in the level of short-term borrowings in the form of bank loans and trade payables. The ratio of equity: bank debt has fallen from 8.4 times ($345,000 ÷ $41,250) to 2.4 times ($375,000 ÷ $158,000), and the real level of reliance on debt is even higher if the increase in the level of trade payables is taken into account. In effect, PCB has financed its expansion wholly by using short-term debt.

Dangers of PCB's position

(i)   **Lack of matching**

The company should **match long-term assets** with **long-term funds**. At present, both the increase in working capital and the increase in non-current assets are being financed out of short-term debt.

(ii)   **Exceeding terms of trade**

Although the use of trade payables as a source of finance is attractive because there is rarely any interest charge, it is likely that PCB is **exceeding its terms** of **trade**, since the increase in the level of payables is so much greater than the increase in the level of sales. It is therefore running the risk of losing the goodwill of its suppliers.

(iii) **Inability to obtain credit**

The current state of the funding means that, on the basis of the balance sheet figures, PCB may find it **hard to obtain additional credit** from existing or new suppliers. This is because of the high level of financial risk now being carried by the trade payables who have no security for their credit.

(iv)   **Problems with bank**

There is no information on the **nature of any agreements** that PCB has with the bank over funding, or any indication as to the size of the overdraft limit. However, as the level of short-term funding increases, the bank will want to review the current and forecast trading situation with the company before increasing its stake in the company any further. It would be in the interest of both parties if the existing overdraft were replaced with some form of secured medium-term bank debt.

(v)   **Increase in risk levels**

The current situation represents an **increase** in the **level of risk** carried by the equity shareholders. As the gearing increases, so the level of the **interest charge** will **increase**, and thus there will be greater volatility in the level of returns to equity, particularly if the business is cyclical in nature. The current cash shortage also means that even if the company continues to be profitable, it will be difficult to sustain the level of dividend payments. This situation is already arising, since dividends have been cut drastically from $35,000 in 20X7 to $12,000 in 20X8.

(d)   The main needs of PCB are to reduce its reliance on short-term debt and to ease its current cash shortage. This could be achieved in the following ways.

(i)   **Conversion of loan**

The short-term bank loan could be **converted** to a **longer-term loan** or debenture as discussed in (c) above.

(ii)   **Increase equity**

The company could seek to **increase the level** of **equity investment**, which would reduce the level of gearing to a safer level. The exact means by which this should be achieved is difficult to specify, since it is not clear from the question whether PCB is a quoted or unquoted company.

(iii) **Venture capital**

It is possible that additional funding in the form of **venture capital** could be appropriate, given the fact that the company is growing. However, PCB would need to satisfy potential investors that it will be able to improve its earnings performance as well as its sales performance.

(iv)   **Improved inventory and receivable control**

As has already been shown, certain elements of working capital have increased at a faster rate than the sales growth would appear to warrant. In particular, there appears to be scope for improving the **control of inventory and receivables**. If both these elements were restricted to a 76% increase in line with the growth in sales, this would release over $72,000 of working capital. This would reduce the need for additional external funding.

12 Special Gift Suppliers

Text references. Working capital management is covered in Chapters 4, 5 and 6.

Top tips. There are one or two traps in (b). Bad debts in the existing arrangement are effectively a double cost; not only is there the cost of writing them off but there is also the cost of financing them before they are written off. Because the factor's services are no-recourse Special Gift Suppliers will not bear *any* costs of bad debts; the factor's reduction of bad debts to 2% does not affect Special Gift Suppliers. Note also that the full factor's fee is not charged but only the interest. This is because you are making a comparison of what would happen if you did or did not use the factor on an annual basis; as the factor's fee is one-off, the annual cost is the interest you could have earned if you hadn't paid that fee. If the $25,000 had been an annual payment, you would have charged the full amount (and factoring would not have been worthwhile).

(c) offers good opportunities to score marks although you must make sure you spend sufficient time discussing permanent working capital; it is easy to spend too long on discussion of credit status. Credit control's role covers monitoring as well as initial granting of credit, and possibly a factor might be able to manage receivables more efficiently as well as providing finance.

Examiner's comment. (a) was straightforward and generally answered well. Answers to (b) were disappointing with a lot of duplication of figures. Answers to (c) were generally good, particularly on credit control. Discussion of the permanent elements of working capital tended to be more variable.

(a)   Funding requirement = Average inventory holding period
                              + Average receivables' collection period
                              – Average payables' payment period
                          = 3.5 + 2.5 – 2.0
                          = 4.0 months

(b)   **Current arrangements**

	$
Bad debts (3% × 90% × $2.5m)	67,500
Salary of sales ledger administrator	12,500
Cost of financing debts (90% × (2.5/12) × 12% × $2.5m)	56,250
	136,250

Factor

	$
Cost of advancing funds (90% × 80% × (1/12) × 15% × $2.5m	22,500
Cost of financing remaining debts (90% × 20% × (1/12) × 12% × $2.5m)	4,500
Charge for factoring services (4% × 90% × $2.5m)	90,000
One-off payment to factor (25,000 × 12%)	3,000
	120,000

Hence it is worthwhile to factor the debts.

(c)   To: Financial Controller, Special Gift Department

From: Adviser
Subject: Working capital
Date: 27 September 20X2

This report covers a number of aspects of managing working capital.

(i)   **Functioning of a credit control department**

The credit control department should be involved with customers at all stages of the credit control cycle.

(1)   When customers **first request credit**, the credit control department should **obtain references** and **credit ratings, analyse their accounts** and obtain other information such as **press comment** as appropriate. Staff may also **visit the customer.** A **credit limit** should be recommended based on the information obtained; initially the limit should be **low**, and only raised over time if the **customer's payment record** is good.

(2)   When the customer makes an order, the credit control department should check whether the **new order** will cause the customer to **exceed** their limits.

(3)   Staff should also **review regularly** the **appropriateness of credit limits**, and **check the aged receivable listing** to see if debts are overdue and **report problems** to **designated senior managers**.

(4)   The credit control department will be responsible for issuing documentation such as **monthly statements** and **demands for payment**. Staff should **maintain contacts** with other departments, trying to ensure that orders are not accepted from customers who are in difficulties. The department will **pursue slow payers**, ultimately **employing debt collectors** and **initiating legal action**.

(5)   The **department's procedures** should be set out in a **credit control manual**.

(ii)   **Benefits of factoring**

(1)   The business can **pay** its **suppliers promptly**, and so be able to take advantage of any early payment discounts that are available.

(2)   **Optimum inventory levels** can be **maintained**, because the business will have enough cash to pay for the inventories it needs.

(3)   **Growth** can be **financed** through **sales** rather than by injecting fresh external capital.

(4)   The business gets **finance linked** to its **volume of sales**. In contrast, overdraft limits tend to be determined by historical balance sheets.

(5)   The **managers** of the business **do not** have to **spend** their **time** on the problems of **slow paying receivables**.

(6)   The business does **not incur** the **costs** of **running** its own **sales ledger department**, and can use the **expertise** of receivable management that the factor has.

(7)   Because they are managing a number of sales ledgers, factors can **manage receivables more efficiently** than individual businesses through economies of scale.

(iii)   **Financing of working capital**

Types of current assets

(1)   The **permanent current assets** businesses hold will include a minimum level of receivables owing money, and minimum balances of inventory and cash held for safety reasons. These minimum levels represent permanent working capital.

(2)   **Fluctuating current assets** are assets held over and above the minimum amounts.

Aggressive management

If working capital is managed **aggressively**, all **fluctuating assets** plus a **certain proportion of permanent current assets** will be **financed by short-term capital** such as **bank overdrafts** and **trade payables**. Aggressive management will mean that there is an **increased risk** of **cash flow** and **liquidity problems**. Businesses may also suffer **higher interest costs** on short-term sources of finance.

Use of long-term capital

If short-term methods cannot be used, **long-term funding** such as **long-term loans** or **share capital** not tied up in funding non-current assets will be used to support **working capital**. This will mean that working capital is managed **conservatively**, with **all non-current assets** and **permanent current assets**, as well as part of **fluctuating current assets**, being **financed by long-term capital**. When fluctuating current assets are low, there will be surplus cash which the company will be able to invest in marketable securities.

13 Ulnad Co

Text references. Working capital management is covered in Chapters 4, 5 and 6.

Top tips. In part (a), think logically about the change in costs as a result of the credit policy and set out your workings clearly. In part (b) don't forget to explain your findings as well as do the calculation. Parts (c) and (d) require full explanations so don't just simply write a list of points.

Easy marks. There are 4 easy marks available in part (b) for simply using the Miller-Orr formulae given to you in the exam. If you have learnt the subject matter in for parts (c) and (d), they should be straightforward explanations.

Marking scheme

			Marks
(a)	Increase in financing cost	2	
	Incremental costs	1	
	Cost of discount	1	
	Contribution from increased sales	1	
	Conclusion	1	
			6
(b)	Calculation of spread	2	
	Calculation of upper limit	1	
	Calculation of return point	1	
	Explanation of findings	2	
			6
(c)	Policy formulation	1-2	
	Credit analysis	1-2	
	Credit control	1-2	
	Collection of amounts due	1-2	
		Maximum	6

(d)	Analysis of assets	1-2
	Short-term and long-term debt	2-3
	Discussion of policies	2-3
	Other factors	1-2
	Maximum	7
		25

(a) **Evaluation of change in credit policy**

Current average collections period = 30 + 10 = 40 days

Current accounts receivable = $6m × 40/365 = $657,534

Average collection period under new policy = (30% × 15 days) + (70% × 60 days) = 46.5 days

New level of credit sales = $6m × 1.05 = $6.3m

Accounts receivable after policy change = $6.3m × 46.5/365 = $802,603

Increase in financing cost = $(802,603 − 657,534) × 7% = $10,155

	$
Increase in financing cost	10,155
Incremental costs ($6.3m × 0.5%)	31,500
Cost of discount (30% × $6.3m × 1.5%)	28,350
Increase in costs	70,005
Contribution from increased sales ($6m × 5% × 60%)	180,000
Net benefit of policy change	109,995

The proposed policy will therefore increase the profitability of Ulnad Co.

(b) **Determination of spread**

Daily interest rate = 5.11/365 = 0.014% per day
Variance of cash flows = 1,000 × 1,000 = $1,000,000 per day
Transaction cost = $18 per transaction

Spread 　= 3 × ((0.75 × transaction cost × variance)/interest rate)$^{1/3}$
　　　　= 3 × ((0.75 × 18 × 1,000,000)/0.00014)1/3 = 3 × 4,585.7 = $13,757

Lower limit = $7,500
Upper limit = $(7,500 + 13,757) = $21,257
Return point = 7,500 + (13,757/3) = $12,086

Relevance of the values

The Miller-Orr model takes account of **uncertainty** in relation to cash flows. The cash balance of Renpec Co is allowed to vary between the lower and upper **limits** calculated by the model.

If the cash balance reaches an **upper limit** the firm **buys sufficient securities** to return the cash balance to a normal level (called the 'return point'). When the cash balance reaches a lower limit, the firm sells securities to bring the balance back to the return point.

The Miller-Orr model therefore helps Renpec Co to decrease the risk of running out of cash, while avoiding the loss of profit caused by having unnecessarily high cash balances.

(c) **Key areas of accounts receivable management**

There are four key areas of accounts receivable management.

(i) **Formulation of policy**

A **framework** needs to be established within which the management of accounts receivable in an organisation takes place. Elements of the framework to be considered include establishing the **terms of trade** such as the period of credit offered and **early settlement discounts.** The organisation must

also consider whether to **charge interest** on overdue accounts. Laid-down procedures will be needed for granting credit to new customers and determining what to do when accounts become overdue.

(ii) **Assessment of creditworthiness**

Information relating to a new customer needs to be analysed. The information may come from bank references, trade references or credit reference agency reports.

The greater the amount of credit being granted and the possibility of repeat business, the more credit analysis is needed.

(iii) **Credit control**

Accounts receivable' payment records must be **monitored** continually. This depends on successful sales ledger administration.

Credit monitoring can be simplified by a system of **in-house credit ratings**. For example, a company could have five credit-risk categories for its customers. These credit categories or ratings could be used to decide either individual credit limits for customers within that category or the frequency of the credit review.

A **customer's payment record** and the **accounts receivable aged analysis** should be examined regularly, as a matter of course. Breaches of the credit limit, or attempted breaches of it, should be brought immediately to the attention of the credit controller.

(iv) **Collection of amounts due**

A company needs to have in place agreed procedures for dealing with overdue accounts. Examples include instituting reminders or final demands, chasing payment by telephone or making a personal approach. If this does not work, the company could refuse to grant any more credit to the customer, hire a specialist debt collecting agency or, as a last resort, take legal action.

The overall **debt collection policy** of the firm should be such that the administrative costs and other costs incurred in debt collection do not exceed the benefits from incurring those costs.

(d) **Formulating a working capital funding policy**

In order to understand working capital financing decisions, assets can be divided into three different types.

Non-current (fixed) assets are long-term assets from which an organisation expects to derive benefit over a number of periods. For example, buildings or machinery.

Permanent current assets are the amount required to meet long-term minimum needs and sustain normal trading activity. For example, inventory and the average level of accounts receivable.

Fluctuating current assets are the current assets which vary according to normal business activity. For example due to seasonal variations.

Fluctuating current assets together with **permanent** current assets form part of the working capital of the business, which may be financed by either long-term funding (including equity capital) or by current liabilities (short-term funding).

Short-term sources of funding are usually **cheaper** and **more flexible** than long-term ones. However short-term sources are **riskier** for the borrower as interest rates are more volatile in the short term and they may not be renewed.

The matching principle suggests that long-term finance should be used for long-term assets. A **balance** between risk and return might be best achieved by a **moderate approach** to working capital funding. This is a policy of **maturity matching** in which long-term funds finance permanent assets while short-term funds finance non-permanent assets. This means that the maturity of the funds **matches** the maturity of the assets.

A **conservative approach** to financing working capital involves all non-current assets and permanent current assets, as well as part of the fluctuating current assets, being financed by long-term funding. This is less risky and less profitable than a matching policy. At times when fluctuating current assets are low, there will be **surplus cash** which the company will be able to invest in marketable securities.

Finally, an organisation may adopt an **aggressive approach** to financing working capital. Not only are fluctuating current assets all financed out of short-term sources, but so are some of the permanent current assets. This policy represents an **increased risk** of liquidity and cash flow problems, although potential returns will be increased if short-term financing can be obtained more cheaply than long-term finance.

Other factors that influence a working capital funding policy include **previous management attitudes to risk**; this will determine whether there is a preference for a conservative, aggressive or moderate approach. Secondly, **previous funding decisions** will determine the current position being considered in policy formulation. Finally, the **size of the organisation** will influence its ability to access different sources of finance. For example, a small company may have to adopt an aggressive working capital funding policy because it cannot raise additional long-term finance.

14 PKA Co

Text references. Working capital management is covered in Chapters 4 and 5. Hedging foreign currency risk is covered in Chapter 19.

Top tips. Part (b) requires a methodical step-by-step approach. Make sure you show all your workings so you can gain marks throughout even if you make a mistake or get stuck.

In part (c) you must answer the specific requirements of the question. Identify the two problem areas and discuss how to address them. Don't just write everything you know about receivables management.

Easy marks. Part (a) provides three easy marks for a textbook explanation and the calculations in part (d) are straightforward if you have learnt the techniques.

Examiner's comments. There were many good answers to part (a) and most candidates gained high marks. However, some answers tended to be somewhat general rather than focusing on the objectives of working capital management and some answers were much too long for the three marks on offer.

In part (b) many candidates incorrectly calculated the holding costs of each policy. Some candidates failed to consider the buffer inventory in calculating holding costs. Others used the re-order inventory level as the buffer level, failing to reduce inventory by consumption during the lead time it took for orders to arrive after being placed. Others added the re-order level to order quantity before dividing by two to calculate average inventory level, when only the order quantity is averaged.

Candidates failing to gain high marks in part (c) tended to offer a limited number of possible methods, for example by focusing at length on factoring to the exclusion of internal accounts receivables management methods. Despite the requirement to discuss domestic accounts receivable, some candidates discussed export factoring and exchange rate hedging.

In part (d) some candidates offered discursive answers, for which they gained little credit since the question asked for an evaluation of hedging methods.

Many candidates were unable to calculate correctly the spot and forward exchange rates from the information provided. Many candidates failed to compare all three hedges from a common time horizon perspective, ie either from the current time or from three months hence.

Marking scheme

		Marks	
(a)	Profitability and liquidity	1	
	Discussion of conflict between objectives	2	
			3
(b)	Cost of cutting ordering policy	3	
	Cost of EOQ–based ordering policy	3	
	Saving by using EOQ model	1	
			7

(c)	Reduction of bad debts	3–4	
	Reduction of average receivable period	3–4	
	Discussion of other improvements	1–2	
		Maximum	7
(d)	Money market hedge	3	
	Forward market hedge	2	
	Lead payment	2	
	Evaluation	1	
			8
			25

(a) **Objectives of working capital management**

The two main objectives of working capital management are to ensure it has **sufficient liquid resources** to continue in business and to **increase its profitability**.

Every business needs adequate **liquid resources** to maintain day-to-day cash flow. It needs enough to pay wages, salaries and accounts payable if it is to keep its workforce and ensure its supplies.

Maintaining adequate working capital is not just important in the short term. Adequate liquidity is needed to ensure the **survival** of the business in the long term. Even a profitable company may fail without adequate cash flow to meet its liabilities.

On the other hand, an excessively conservative approach to working capital management resulting in high levels of cash holdings will **harm profits** because the opportunity to make a return on the assets tied up as cash will have been missed.

These two objectives will often **conflict** as liquid assets give the lowest returns.

(b) **Cost of current ordering policy**

Minimum inventory level = re-order level – (average usage × average lead time)

Average usage per week = 625,000 units/ 50 weeks = 12,500 units

Average lead time = 2 weeks

Re-order level = 35,000 units

Minimum inventory level = 35,000 – (12,500 × 2) = 10,000 units

Average inventory = Minimum level + $\dfrac{\text{reorder quantity}}{2}$

$\qquad\qquad$ = 10,000 + (100,000/2)

$\qquad\qquad$ = 60,000 units

Annual holding cost = 60,000 × €0.50 = €30,000

Annual ordering cost = €250 × (625,000/100,000) = €1,563

Annual total cost = 30,000 + 1,563 = **€31,563**

Economic order quantity

$$EOQ = \sqrt{\dfrac{2C_0 D}{C_H}} = \sqrt{\dfrac{2 \times 250 \times 625,000}{0.5}} = 25,000 \text{ units.}$$

Number of orders per year = 625,000/25,000 = 25

Annual ordering cost = €250 × 25 = €6,250

Annual holding cost = (10,000 + (25,000/2)) × €0.50 = €11,250

Annual total cost = 11,250 + 6,250 = **€17,500**

Saving as a result of using the economic order quantity model = 31,563 – 17,500 = **€14,063** per year

(c) **Areas for improvement**

The two areas of concern are the increase in the percentage of bad debts from 5% to 8% of sales and the excessive credit period being taken by customers.

Reducing the percentage of bad debts

The key to reducing the percentage of bad debts is to assess the **credit worthiness** of customers. The risks and costs of a customer defaulting will need to be balanced against the profitability of the business provided by that customer.

PKA Co needs to examine its system for checking the credit worthiness of customers and instigate a policy or improve the current policy. For example, new customers should give two **good references**, including one from a bank, before being granted credit; **credit ratings** might be **checked** through a credit rating agency; a **new customer's credit limit** should be **fixed** at a **low level** and only increased if his payment record subsequently warrants it.

Reducing the average accounts receivable period

The average accounts receivable period was over twice the agreed 30 day credit period. This is costly for PKA in terms of the **opportunity costs of interest** on additional borrowed funds and also the **loss of opportunity to make a return** on the money tied up.

Encouraging early payment

PKA first needs to find out whether **competitors'** receivables periods are similarly long. If they are, PKA would have to be careful not to lose business as a result of over-stringent credit control action. A better approach would be to **encourage** early payment, perhaps through early settlement discounts.

Improved credit control procedures

If competitors are not experiencing the same problems, PKA needs to examine its own credit control policies and procedures. For example, accounts **receivable' payment records** must be **monitored** continually. This depends on successful sales ledger administration.

A customer's payment record and the **accounts receivable aged analysis** should be examined regularly, as a matter of course. Breaches of the credit limit, or attempted breaches of it, should be brought immediately to the attention of the credit controller.

PKA needs to have in place agreed procedures for dealing with **overdue accounts**. Examples include instituting reminders or final demands, chasing payment by telephone or making a personal approach. If this does not work, the company could refuse to grant any more credit to the customer, hire a specialist debt collecting agency or, as a last resort, take legal action.

(d) **Money market hedge**

Money market hedging would involve borrowing in euros, converting the money borrowed into dollars and putting the money on deposit until the time the transaction is completed, hoping to take advantage of favourable interest rate movements.

$ interest rate over six months = 3.5/2 = 1.75%
$s required now in order to have $250,000 in six months' time = 250,000/1.0175 = $245,700
Current spot selling rate = 1.998 – 0.002 = $1.996 per €
Cost of $s to be deposited = 245,700/1.996 = €123,096
€ interest rate over six months = 6.1/2 = 3.05%
Value of € loan in six months' time = 123,096 × 1.0305 = **€126,850**

Forward market hedge

Forward exchange contracts hedge against transaction exposure by allowing the importer to arrange for a bank to buy a quantity of foreign currency at a future date, at a rate of exchange determined when the forward contract is made.

Six months forward rate = 1.979 – 0.004 = $1.975 per €

€ cost using forward market hedge = 250,000/1.975 = **€126,582**

Lead payment

A lead payment is a **payment in advance**. This is particularly useful if the currency in which the payment is to be made is appreciating, as is the case here.

€ cost now = 250,000/1.996 = €125,251

This money would need to be borrowed so there is an interest cost.

€ value of loan in six months' time = 125,251 × 1.0305 = **€129,071**

Conclusion

All of the hedging methods relate to six months in the future so can be directly compared. The lead payment is the most expensive method and the **forward market hedge is the cheapest**. It is therefore recommended that a forward market hedge be used.

15 FLG Co

> **Text references.** Working capital is covered in Chapters 4 and 5.
>
> **Top tips.** Make sure you read the requirement in part (a), so that your answer refers to factors which determine the level of investment in current assets and not working capital funding strategies.
>
> Set your workings out clearly in parts (c) and (d) to get the maximum number of marks.
>
> **Easy marks.** Parts (a) and (b) require general discussions which should provide easy marks if you have learnt the necessary material.
>
> **Examiner's comments.** In part (a), candidates who answered the actual question requirement gained high marks. In part (b) many candidates discussed relevant points in relation to factoring and received credit accordingly. Discussions of invoice discounting tended to be variable in quality, with a significant number of students believing incorrectly that invoice discounting meant early settlement discounts.
>
> The variable quality of the answers to part (c) indicates a need for candidates to ensure, not only that they are familiar with accounting ratios, but also that they are familiar with the accounting items to which the ratios relate, in this case sales, cost of sales, inventory, trade receivables, trade payables and so on. Many candidates were unable to calculate the inventory turnover period, given the operating cycle, the average collection period and the average payable period. Many candidates were also unable to work backwards from the provided ratios, for example to calculate the level of receivables given the average collection period and the amount of credit sales. Some candidates omitted the overdraft when calculating net working capital, indicating unfamiliarity with the structure of the balance sheet.
>
> Many candidates gained high marks in part (d) by offering a comprehensive answer. Candidates who did not gain high marks appeared to be unsure of the meaning of the variables in the EOQ, even though the units of each were clearly specified in the question.

Marking scheme

			Marks
(a)	Discussion of key factors		6
(b)	Discussion of factoring	4-5	
	Discussion of invoice discounting	1-2	
	Maximum		6

(c)		Value of inventory	1	
		Accounts receivable and accounts payable	1	
		Current liabilities	1	
		Size of overdraft	1	
		Net working capital	1	
		Total cost of financing working capital	1	
				6
(d)	(i)	Economic order quantity	1	
		Ordering cost and holding cost under EOQ	1	
		Inventory cost under EOQ	1	
		Total cost of inventory with EOQ policy	1	
				4
	(ii)	Ordering cost and holding cost with discount	1	
		Inventory cost with discount	1	
		Total cost of inventory with bulk purchase discount	1	
		Conclusion	1	
		Maximum		3
				25

(a) **Factors which determine the level of investment in current assets**

The level of working capital will depend on the policy of the organisation and the industry in which it operates.

Industry in which organisation operates

Some industries, such as ship building, will have long operating cycles and high levels of investment in working capital, due to the length of time required to manufacture goods. Other industries such as supermarkets will have rapid inventory turnover and have short operating cycles.

Working capital policy

Organisations have to decide what are the most important risks relating to working capital, and therefore whether to adopt a conservative, aggressive or moderate approach.

A conservative approach

A conservative working capital management policy aims to **reduce the risk of operational breakdown** by holding high levels of working capital.

Customers are allowed generous payment terms to stimulate demand, finished goods inventories are high to ensure availability for customers, and raw materials and work in progress are high to minimise the risk of running out of inventory and consequent downtime in the manufacturing process. Suppliers are paid promptly to ensure their goodwill, again to minimise the chance of stock-outs.

However, the cumulative effect on these policies can be that the firm carries a high burden of unproductive assets, resulting in a **financing cost** that can destroy **profitability**. A period of rapid expansion may also cause severe cash flow problems as working capital requirements outstrip available finance. Further problems may arise from inventory obsolescence and lack of flexibility to customer demands.

An aggressive approach

An aggressive working capital management policy aims to **reduce this financing cost** and **increase profitability** by cutting inventories, speeding up collections from customers, and delaying payments to suppliers.

The potential disadvantage of this policy is an increase in the chances of **system breakdown** through running out of inventory or **loss of goodwill** with customers and suppliers.

However, modern manufacturing techniques encourage inventory and work in progress reductions through just–in–time policies, flexible production facilities and improved quality management. Improved customer

satisfaction through quality and effective response to customer demand can also mean that credit periods are shortened.

These characteristics are useful for comparing and analysing the different ways individual organisations deal with working capital and the **trade off** between **risk and return**.

(b) Some companies use **factoring** and **invoice discounting** to help short-term liquidity or to reduce administration costs.

Factoring

Factoring is an arrangement to have debts collected by a factor company, which **advances** a proportion of the money it is due to collect. This is usually up to 80% of the face value of invoices raised. The finance is repaid once the invoices have been settled and the balance is passed to the issuing company after deduction of a **fee**. This fee is equivalent to an **interest charge** on the cash advanced.

Factoring usually involves **administration** of the client's invoicing, sales accounting and debt collection service and **credit protection** for the client's debts, whereby the factor takes over the risk of loss from bad debts and so 'insures' the client against such losses. This is known as a **non-recourse** service. However, if a **non-recourse** service is provided the factor, not the firm, will decide what action to take against non-payers.

Invoice discounting

Invoice discounting is the purchase (by the provider of the discounting service) of trade debts at a discount. Invoice discounting enables the company from which the debts are purchased to raise working capital.

The invoice discounter does not take over the administration of the client's sales ledger.

A client should only want to have some invoices discounted when he has a **temporary cash shortage**, and so invoice discounting tends to consist of one-off deals.

(c) Operating cycle = 3 months

	Months
Receivables	2
Payables	(1)
Inventory (balancing figure)	2
Operating cycle	3

Level of inventory = 2/12 × $1.89m = $315,000

Accounts receivable = 2/12 × $4.2m = $700,000

Accounts payable = 1/12 × $1.89m = $157,500

Current ratio = Current assets/current liabilities = 1.4

1.4 = (315,000 + 700,000)/current liabilities

Current liabilities = (315,000 + 700,000)/1.4 = $725,000

Current liabilities = Accounts payable + overdraft

725,000 = 157,500 + overdraft

Overdraft = 725,000 – 157,500 = **$567,500**

Net working capital = Current assets – current liabilities
= 315,000 + 700,000 – 725,000
= **$290,000**

Cost of financing working capital

		$
Overdraft	7% × $567,500	39,725
Long-term finance	11% × $290,000	31,900
Total cost		71,625

(d)　(i)

$$\text{EOQ} = \sqrt{\frac{2 \times \text{demand (units)} \times \text{ordering cost}}{\text{holding cost}}}$$

$$= \sqrt{\frac{2 \times 60{,}000 \times 6}{0.5}}$$

$$= \sqrt{1{,}440{,}000}$$

$$= 1{,}200 \text{ units}$$

Number of orders per year = 60,000/1,200 = 50 orders

Annual ordering cost = 50 × $6 = $300

Average inventory held = 1,200/2 = 600 units

Annual holding cost = 600 × 0.5 = $300

Inventory cost = 60,000 x $12 = $720,000

Total cost of inventory using EOQ = 720,000 + 300 + 300 = **$720,600**

(ii)　Order size for bulk discounts is 10,000

Number of orders per year = 60,000/10,000 = 6

Annual ordering cost = 6 × $6 = $36

Average inventory = 10,000/2 = 5,000 units

Annual holding cost = 5,000 × $2 = $10,000

Inventory cost = 60,000 × $12 × 99% = $712,800

Total cost of inventory with discount = 712,800 + 36 + 10,000 = **$722,836**

Using the **EOQ approach** will result in a slightly lower inventory cost.

16　HGR Co

Text reference. Working capital financing and cash flow forecasting are covered in Chapter 6 and receivables management in Chapter 5.

Top tips. This is a time pressured question that will need to be carefully planned to obtain the maximum marks. Parts (a) and (c) should be straightforward discussions, provided you answer the specific requirements. Part (b) has some tricky parts in calculating the effect of the finance director's proposals. If you get stuck, make an assumption and move on.

Easy marks. The easiest marks are probably for the discussion parts, provided you have sufficient knowledge of this area of the syllabus.

Examiner's comments. In part (a) some candidates ignored the word 'financing' and discussed working capital strategy in general. Better answers recognised the aggressive financing strategy and discussed how current assets could be divided into fluctuating and permanent current assets, linking this via the matching principle to the use of short-term and long-term finance.

Many candidates had great difficulty in part (b). Common errors included failing to recognise that the opening balance was the overdraft, calculating annual rather than monthly interest and including cash flows other than those given in the question. The general standard of answers showed that many candidates need further preparation in the important area of cash flow preparation.

Some answers in part (c) were one-sided concentrating on exchange rate risk rather than on credit risk.

Marking scheme

			Marks
(a)	Analysis of current assets		
	Short-term and long-term finance	1-2	
	Matching principle	2-3	
	Financing approach used by company	1-2	
		1-2	
		Maximum	7
(b)	Bank balance if no action is taken	2	
	Bank balance if action is taken	5	
	Working capital management implications	1-2	
	Advice on course of action	1-2	
		Maximum	10
(c)	Relevant discussion		8
			25

(a) **Working capital financing strategy of HGR Co**

Working capital can be financed using **short-term** finance or **long-term** finance or a mixture of the two.

Short-term finance

An **overdraft** is an example of short-term finance. It is **flexible** as it is used as and when it is needed and **variable interest** is charged. It is however **risky** as it can be withdrawn at any time by the bank and the **interest rate** charged may be **higher** than a short-term loan. In general, the **term structure** of interest rates suggests that short-term debt finance has a **lower cost** than long-term debt finance.

HGR Co has an overdraft facility of $4 million and at the current date is using nearly all of this facility. 83% (14,000,000/16,935,000 × 100) of current assets are financed from short-term sources in the form of the overdraft and trade payables.

Long-term finance

The **matching principle** suggests that long-term finance should be used for long-term investments. In terms of working capital finance, this means that long-term finance should be matched with **permanent current assets** and **non-current assets**.

Permanent current assets are the amount required to meet long-term minimum needs and sustain normal trading activity. For example, inventory and the average level of accounts receivable. As a business grows, the level of permanent current assets will grow.

17% (2,935,000/16,935,000 × 100) of HGR's current assets are financed from equity finance and traded bonds, which are long-term sources of finance.

HGR Co's policy

HGR Co's working capital financing policy is **aggressive** as it mostly consists of short-term finance. This policy represents an **increased risk** of liquidity and cash flow problems, although potential returns will be increased if short-term financing can be obtained more cheaply than long-term finance.

(b) **Bank balance in three months' time if no action is taken**

Month	1	2	3
	$000	$000	$000
Receipts	4,220	4,350	3,808
Payments	(3,950)	(4,100)	(3,750)
Interest on bonds		(200)	
Overdraft interest (W3)	(19)	(18)	(18)
Capital investment			(2,000)
Net cash flow	251	32	(1,960)
Opening balance	(3,800)	(3,549)	(3,517)
Closing balance	(3,549)	(3,517)	(5,477)

Bank balance in three months' time if the finance director's proposals are implemented

Month	1	2	3
	$000	$000	$000
Receipts	4,220	4,350	3,808
Payments	(3,950)	(4,100)	(3,750)
Interest on bonds		(200)	
Overdraft interest (W3)	(19)	(15)	(13)
Capital investment			(2,000)
Accounts receivable (W1)	270	270	270
Inventory (W2)	204	204	204
Net cash flow	725	509	(1,481)
Opening balance	(3,800)	(3,075)	(2,566)
Closing balance	(3,075)	(2,566)	(4,047)

Workings

(1) Reduction in accounts receivable days

Current accounts receivable days = (8,775/49,275) × 365 = 65 days

Reduction in days over 6 months = 65 – 53 = 12 days

Monthly reduction = 12/6 = 2 days

Each receivables day is equivalent to 8,775,000/65 = $135,000

Monthly reduction in accounts receivable = 2 × 135,000 = $270,000

(2) Reduction in inventory days

Current inventory days = (8,160/37,250) × 365 = 80 days

Each inventory day is equivalent to 8,160,000/80 = $102,000

Monthly reduction in inventory = 102,000 × 2 = $204,000

(3) Overdraft interest

Monthly overdraft interest rate $\quad = \sqrt[12]{1.0617} - 1$

$= 1.005 - 1$

$= 0.005$ or 0.5%

If no action is taken:

Period 1 interest = 3,800,000 × 0.5% = $19,000

Period 2 interest = 3,549,000 × 0.5% = $17,745

Period 3 interest = 3,517,000 × 0.5% = $17,585

If action is taken:

Period 1 interest = 3,800,000 × 0.5% = $19,000

Period 2 interest = 3,075,000 × 0.5% = $15,375

Period 3 interest = 2,566,000 × 0.5% = $12,830

Comment

The cash flow forecast shows that, if no action is taken, HGR Co will **exceed its overdraft limit** of $4 million by $1.48 million in three months' time.

If the finance director's suggestions for action are taken, the bank balance will **improve** but the overdraft limit will still be exceeded by $47,000.

Following this 3 month period, the bank balance will continue to improve by $270,000 per month due to the **reduction in accounts receivable**. Further information would be needed on other future cash flows to forecast whether the overdraft would then return to under the limit.

The main reason why there is a cash shortfall is the **capital expenditure** of $2 million. This is a **long-term** investment that should be financed using long-term sources of finance, such as equity or bonds. If this were to happen, the overdraft balance would be $3.48 million at the end of three months if no action was taken, and $2.05 million if the finance director's suggestions were implemented.

HGR Co could raise finance through **long-term debt** using the $48,965,000 of non-current assets as security. The six-monthly interest payment of $200,000 suggests that HGR Co is not highly geared so there is room for more long-term debt finance.

Recommendation

HGR Co should implement the finance director's suggestion for working capital management and use long-term debt to finance the capital expenditure.

(c) **Risks arising from granting credit to foreign customers**

Foreign debts raise the following special problems. When goods are sold abroad, the customer might ask for credit. Exports take time to arrange, and there might be complex paperwork. Transporting the goods can be slow, if they are sent by sea. These **delays in foreign trade** mean that exporters often build up **large investments** in inventories and accounts receivable. These working capital investments have to be financed somehow.

The **risk of bad debts** can be greater with foreign trade than with domestic trade. If a foreign customer refuses to pay a debt, the exporter must pursue the debt in the debtor's own country, where procedures will be subject to the laws of that country.

How risks can be managed and reduced

A company can reduce its investment in foreign accounts receivable by insisting on **earlier payment** for goods. Another approach is for an exporter to arrange for a **bank to give cash for a foreign debt**, sooner than the exporter would receive payment in the normal course of events. There are several ways in which this might be done.

Where the exporter asks his bank to handle the collection of payment (of a bill of exchange or a cheque) on his behalf, the bank may be prepared to make an **advance** to the exporter against the collection. The amount of the advance might be 80% to 90% of the value of the collection.

Negotiation of bills or cheques is similar to an advance against collection, but would be used where the bill or cheque is payable outside the exporter's country (for example in the foreign buyer's country).

Discounting bills of exchange is where a bank buys the bill before it is due and credits the value of the bill after a discount charge to the company's account.

Export factoring could be considered where the exporter pays for the specialist expertise of the factor in order to reduce bad debts and the amount of investment in foreign accounts receivable.

Documentary credits provide a method of payment in international trade, which gives the exporter a secure risk-free method of obtaining payment. The buyer (a foreign buyer, or a UK importer) and the seller (a UK exporter or a foreign supplier) first of all agree a contract for the sale of the goods, which provides for payment through a documentary credit. The buyer then requests a bank in his country to issue a letter of credit in favour of the exporter. The issuing bank, by issuing its letter of credit, guarantees payment to the beneficiary.

Countertrade is a means of financing trade in which goods are exchanged for other goods.

Export credit insurance is insurance against the risk of non-payment by foreign customers for export debts. If a credit customer defaults on payment, the task of pursuing the case through the courts will be lengthy, and it might be a long time before payment is eventually obtained.

Premiums for export credit insurance are however very high and the benefits are sometimes not fully appreciated.

17 Preparation question: Investment appraisal

(a), (b)

	0	1	2	3	4	5	6
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Sales		1,550	1,550	1,550	650	650	
Cost of sales							
(40% sales)		(620)	(620)	(620)	(260)	(260)	
Distribution costs							
(10% sales)		(155)	(155)	(155)	(65)	(65)	
Net profits		775	775	775	325	325	
Royalty to joint venture partner							
(20% net profits)			(155)	(155)	(155)	(65)	(65)
Investment	(2,100)						
Net cash flows	(2,100)	775	620	620	170	260	(65)
Discount factor 5%	1.000	0.952	0.907	0.864	0.823	0.784	0.746
Present value	(2,100)	738	562	536	140	204	(48)
Discount factor 10%	1.000	0.909	0.826	0.751	0.683	0.621	0.564
Present value	(2,100)	704	512	466	116	161	(37)

Net present value at 5% is $32,000. The project is (just) financially viable.

Net present value at 10% is ($178,000)

$$IRR \approx a + \left[\left(\frac{NPV_a}{NPV_a - NPV_b}\right)(b-a)\right]\%$$

$$IRR \approx 5 + \left[\frac{32}{(32+178)} \times (10-5)\right]$$

$\approx 5.76\%$, say 6%

(c)   **Payback period**

Cumulative cash flows

Year	$'000
0	(2,100)
1	(1,325)
2	(705)
3	(85)
4	85

Payback period is 4 years.

18 Chromex Co

(a)   **Payback**

The payback method of project appraisal involves calculating the period of time that it is likely to take to recoup the initial outlay on a project, and then comparing this with what the company defines as an acceptable period. If the payment period is less than that defined as acceptable, and provided that there are no other constraints for example capital rationing, the project will be accepted.

Limitations of payback

(i)   It **ignores** the **timing of cash flows** within the payback period, the cash flows at the payback period and therefore the total project return.

(ii)   It **ignores** the time **value of money.**

(iii)   It is **unable** to **distinguish between projects** with the same payback period.

(iv)   It **tends** to **favour short term** (often smaller) projects over longer term projects.

(v)   It takes account of the **risk** of the timing of cash flows but **not** the **variability** of those cash flows.

Popularity of payback

(i)   It is **simple to calculate** and **simple to understand**, and this may be important when management resources are limited. It is similarly helpful in communicating information about minimum requirements to managers responsible for submitting projects.

(ii)   It **can be used** as a **screening device** as a first stage in eliminating obviously inappropriate projects prior to more detailed evaluation.

(iii)   The fact that it tends **to bias in favour of short term projects** means that it tends to minimise both financial and business risk.

(iv)   It can be used when there is a **capital rationing situation** to identify those projects which generate additional cash for investment quickly.

(b)   The **payback period** is calculated on the basis of the **incremental cash flows** arising to Chromex following the acquisition.

The annual cash flows will be:

	$'000
Operating profit	10,000
Add back non-cash items:	
Depreciation	500
Annual labour savings	700
Annual incremental cash flow	11,200

The net cost of the acquisition is the bid value of $150m *less* the actual income of $10m ($15m-$5m) received from the sale of the land and buildings, ie $140m.

The payback period is therefore 140m ÷ 11.2m = **12.5 years**

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(c)   **Additional information required**

(i)   Details of the **timescale** over which the investment is to be assessed

(ii)   **Annual cashflow forecasts** for the appraisal period, adjusted for inflation as necessary

(iii)   An appropriate estimate of the **cost of capital** to be used in the calculations

(iv)   An estimate of the **terminal value**, ie the amount that could be realised from the investment at the end of the period

(v)   An indication of the proposed **financing mix** in order to account for the effect of the tax shield on debt interest

(vi)   Information on the effective rate of **tax** on profit and the possibility of claiming **tax allowable depreciation**

(d)   **Competition authorities**

Chromex already supplies nearly one quarter of the UK bicycle market, and the Bexell acquisition would push the market share up to 34%. In view of this it is possible that the government might decide that there is a potential monopoly situation and refer the bid to the **Competition Commission**. The role of the Commission would be to assess the likely effect of the bid on the **public interest**. If it decides that the bid could have an adverse effect on the public, for example due to the restriction of choice, it may request the companies involved to change the terms of the deal. One of the main effects of this would obviously be to delay the progress of the bid. In reaching its decision, the government must also take into account whether the proposals contravene any of the EU regulations on fair competition.

(e)   **Choice of ratios**

There are a large number of ratios that could be chosen in this context. However, a range of ratios should be chosen to ensure that an analysis is made of the four main areas of company performance as follows.

	Performance area	Ratios that could be selected
1	**Profitability and return**	Return on sales Return on investment Asset turnover
2	**Debt and gearing**	Gearing ratio Debt ratio Interest cover
3	**Liquidity**	Current ratio Quick ratio Receivable payment period Payable payment period Inventory turnover
4	**Shareholders' investment ratios**	Dividend yield Earnings per share Price/earnings ratio Dividend cover Earnings yield

Some of the reasons why comparison should be based on companies in the same sector are as follows.

(i)   **Working capital requirements**

Different industries have very **different working capital requirements**. For example, a supermarket will have a much lower level of receivables than an aerospace manufacturer due to the differing levels of credit sales. Similarly, manufacturing businesses generally require a much greater investment in inventories than do service businesses. This makes a meaningful comparison of the liquidity ratios impossible.

(ii) Fixed costs

Different industries have **different levels of fixed costs**. For example, the fixed costs of a small management consultancy will be much lower than those of a capital equipment manufacturer. Different cost structures make it difficult to compare relative levels of profitability and gearing.

(iii) Business risk

There will be **different levels of business risk and earnings volatility** in different industrial sectors. Again, this makes it impossible to compare the investment and gearing ratios of different companies.

19 Preparation question: NPV with inflation and tax

NPV calculation

	20X3 €	20X4 €	20X5 €	20X6 €
Website (W1)		(150,000)	(11,000)	(12,100)
Extra sales (W2)		50,400	66,150	83,349
Extra variable costs (W3)		(31,680)	(43,560)	(57,499)
Fixed costs saved (W4)		79,200	87,120	95,832
Extra profit/ loss		(52,080)	98,710	109,582
Tax @ 30%		15,624	(29,613)	(32,875)
Hardware	(60,000)			10,000
Working capital (W5)	(20,000)	(13,000)	14,850	18,150
WDA @ 30% (W6)	4,500	3,375	2,531	4,594
	(75,500)	(46,081)	86,478	109,451
Discount factor (10%)	1.000	0.909	0.826	0.751
PV	(75,500)	(41,888)	71,431	82,198

NPV   €36,241

As the NPV is positive, management should proceed with the investment.

Workings

(1)   *Website*

	20X3	20X4	20X5
Cost	€150,000	€11,000	€12,100
		$(10,000 \times 1.1)$	$(10,000 \times 1.1^2)$

(2)   *Extra sales*

€50,400	€66,150	€83,349
$(48,000 \times 1.05)$	$(60,000 \times 1.05^2)$	$(72,000 \times 1.05^3)$

(3)   *Extra variable costs*

€31,680	€43,560	€57,499
$(48,000 \times 60\% \times 1.1)$	$(60,000 \times 60\% \times 1.1^2)$	$(72,000 \times 60\% \times 1.1^3)$

(4)   *Savings in fixed costs*

20X4	20X5	20X6
€79,200	€87,120	€95,832
$((€1.2m \times 30\% \times 1.1) - €316,800)$	$(€79,200 \times 1.1)$	$(€87,120 \times 1.1)$

(5)   *Working capital*

	20X3 €	20X4 €	20X5 €	20X6 €
Investment (@ 20X3 prices)	20,000	30,000	15,000	0
Investment (@ inflated prices)	20,000	33,000	18,150	0
Year move (@ inflated prices)	(20,000)	(13,000)	14,850	18,150

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(6)   *Capital allowances* (25% reducing balance)

	€		€
20X3	60,000		
	(15,000)	× 30%=	4,500
20X4	45,000		
	(11,250)	× 30%=	3,375
20X5	33,750		
	(8,438)	× 30%=	2,531
20X6	25,312		
	(10,000)		
Balancing allowance	15,312	× 30%=	4,594

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Text references. Investment appraisal methods are covered in Chapters 7, 8 and 9.

Top tips. Be careful with the fixed costs in part (a). They are relevant but incremental does not mean variable. Make sure you focus on NPV in part (c).

Easy marks. The calculations in parts (a) and (b) should be straightforward and gain easy marks.

Examiner's comments. This was the most popular question on this paper and many answers gained high marks in parts (a) and (b). Many answers showed a shallow understanding of the issues in part (c).

Marking scheme

		Marks
(a)	Sales revenue	1
	Material costs	1
	Variable production costs	1
	Advertising	1
	Incremental fixed costs	2
	Taxation	1
	Capital allowance tax benefits	1
	Discount factors	1
	Net present value	1
	Comment	1
		11
(b)	Net present value	1
	IRR	3
	Comment	1
		5
(c)	Up to 2 marks for each detailed point made	9
		25

(a) **Calculation of net present value of proposed investment**

Year	1	2	3	4
	$'000	$'000	$'000	$'000
Sales	3,750	1,680	1,380	1,320
Direct materials	(810)	(378)	(324)	(324)
Variable production cost	(900)	(420)	(360)	(360)
Advertising	(650)	(100)		
Fixed costs (W1)	(600)	(600)	(600)	(600)
Operating cash flow	790	182	96	36
Tax at 30%	(237)	(55)	(29)	(11)
Tax saved by capital allowance (W2)	60	60	60	60
Net cash flow	613	187	127	85
10% discount factors	0.909	0.826	0.751	0.683
Present value	557.2	154.5	95.4	58.1

Workings

(1)   Fixed costs in year 1 = 150,000 × $4.

This is a one-off increase in fixed costs and will not then vary with production.

(2)   Tax saved by capital allowance = $800,000/4 × 30% = $60,000 per annum

Total present value = $865,200

Net present value = $(865,200 − 800,000) = $65,200

This net present value is **positive** and the investment is therefore worthwhile on financial grounds. However this does depend on very high sales in the first year which may not be achievable.

(b) **Calculation of NPV using a discount rate of 20%**

Year	1	2	3	4
	$'000	$'000	$'000	$'000
Net cash flow	613	187	127	85
20% discount factors	0.833	0.694	0.579	0.482
Present value	510.6	129.8	73.5	41.0

Net present value = $(754,900 − 800,000) = − $45,100

Using the formula

$$IRR \approx a + \left(\left(\frac{NPV_a}{NPV_a - NPV_b}\right)(b-a)\right)\%$$

$$IRR \approx 10 + \left[\frac{65,200}{65,200 + 45,100} \times (20-10)\right]\% = 15.91\%, \text{ say } 16\%$$

An IRR of 16% is higher than the discount rate of 10% used to appraise new investments. The investment is therefore financially acceptable.

(c)   The net present value method of investment appraisal has a number of **advantage**s over other methods.

(i)   It is based on **cash flows** not accounting profit unlike ROCE. Accounting profits are subject to a number of different accounting treatments and cash flows can add to the wealth of the shareholders via increased dividends.

(ii)   NPV looks at cash flows throughout the **whole** of an investment period unlike payback, which ignores cash flows after the end of the payback period. This avoids the incorrect rejection of projects with later high returns, although it is unlikely in practice that payback would be used in isolation.

(iii)   NPV incorporates the **time value of money** by using discounted cash flows whereas ROCE and payback do not. This means that it takes account of the fact that $1 today is worth more than $1 in

one year's time. Discounted payback can be used but this will still ignore cash flows after the payback period.

(iv) NPV is viewed as being **technically superior** to IRR and **simpler to calculate**. It reflects the amount of the initial value rather than a relative measure of return and represents the change in total market value that will occur if the investment project is accepted. Other investment appraisal methods do not directly show the potential increase in shareholder wealth, which is a primary financial management objective.

(v) The NPV method is superior for ranking **mutually exclusive projects** in order of attractiveness. IRR will give an incorrect indication where discount rates are less than the IRR of incremental cash flows.

(vi) Where cash flow patterns are **non-conventional,** for example where the sign of the net cash flow changes in successive periods, there may be several IRRs which decision makers must be aware of to avoid making the wrong decision. NPV however can accommodate these non-conventional cash flows.

(vii) When discount rates are expected to **differ** over the life of the project, such variations can be incorporated easily into NPV calculations, but not into IRR calculations.

(viii) An assumption underlying the NPV method is that any net cash inflows generated during the life of the project will be **reinvested at the cost of capital** (that is, the discount rate). The IRR method, on the other hand, assumes these cash flows can be reinvested to earn a return equal to the IRR of the original project, which is not necessarily reasonable.

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Text references. Investment appraisal is covered in Chapters 7, 8 and 9.

Top tips. In part (a), set out your workings clearly to gain the maximum number of marks for your workings. Do as much of the NPV calculation as you possibly can, as marks are awarded for each stage. Make an assumption and carry on if you get stuck on any part. Nominal cash flows are used so the nominal discount rate must be calculated and used.

Remember to deduct depreciation from the cash flows in part (b) to calculate accounting profit.

Write a full answer with clearly made and well supported arguments in part (c). As we say in Passing F9 in the front pages of this kit, don't just list the strengths and weaknesses.

Easy marks. Part (b) is a straightforward relatively simple calculation. Part (c) is a standard textbook discussion and you should be able to gain most of the marks.

Marking scheme

		Marks	
(a)	Discount rate	1	
	Inflated sales revenue	2	
	Inflated variable cost	1	
	Inflated fixed production overheads	1	
	Taxation	2	
	Capital allowance tax benefits	3	
	Discount factors	1	
	Net present value	1	
	Comment	1	
			13
(b)	Calculation of average annual accounting profit	2	
	Calculation of average investment	2	
	Calculation of return on capital employed	1	
			5

(a)   **Calculation of NPV**

Nominal discount rate:

$(1 + i) = (1 + r)(1 + h) = 1.057 \times 1.05 = 1.10985$

$i = 11\%$

	1	2	3	4	5
	$'000	$'000	$'000	$'000	$'000
Sales (W1)	433	509	656	338	
Variable cost (W2)	284	338	439	228	
Contribution	149	171	217	110	
Fixed production overheads	27	28	30	32	
Net cash flow	122	143	187	78	
Tax		(37)	(43)	(56)	(23)
CA tax benefits (W3)		19	14	11	30
After-tax cash flow	122	125	158	33	7
Disposal				5	
After-tax cash flow	122	125	158	38	7
Discount factors	0.901	0.812	0.731	0.659	0.593
Present values	110	102	115	25	4

	$
PV of benefits	356,000
Investment	250,000
NPV	106,000

Workings

1

Year	1	2	3	4
Demand (units)	35,000	40,000	50,000	25,000
Selling price ($/unit)	12.36	12.73	13.11	13.51
Sales ($/year)	432,600	509,200	655,500	337,750

2

Year	1	2	3	4
Demand (units)	35,000	40,000	50,000	25,000
Variable cost ($/unit)	8.11	8.44	8.77	9.12
Sales ($/year)	283,850	337,600	438,500	228,000

3

	Capital allowances	$	**Tax benefits**	$
1	250,000 × 0.25 =	62,500	62,500 × 0.3 =	18,750
2	62,500 × 0.75 =	46,875	46,875 × 0.3 =	14,063
3	46,875 × 0.75 =	35,156	25,156 × 0.3 =	10,547
4	By difference	100,469	100,469 × 0.3 =	30,141
	250,000 – 5,000 =	245,000		73,501

(b)   **Calculation of before-tax return on capital employed (ROCE)**

Cash flow before tax = 122 + 143 + 187 +78 = $530,000

Total depreciation = (250,000 – 5,000) = $245,000

Average annual accounting profit = (530 – 245)/4 = $71,250

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Average investment = (250,000 + 5,000)/2 = $127,500

ROCE = 71,250/127,500 × 100 = 56%

The target ROCE is 20% and the expected ROCE is significantly higher than this so the purchase of the machine can be recommended.

(c)   **Strengths of IRR**

The main advantage of the IRR method is that the information it provides is **more easily understood** by managers than NPV, especially non-financial managers. It gives a **relative measure** of the value of a proposed investment in the form of a percentage which can be compared with the company's cost of capital or the rates of interest and inflation.

IRR is a **discounted cash flow method** and so takes account of the **time value** of money: the concept that $1 received today is not equal to $1 received in the future.

IRR considers cash flows over the **whole** of the project life and is sensitive to both the amount and the **timing** of cash flows.

Weaknesses of IRR

IRR ignores the **relative sizes** of investments. It therefore does not measure the absolute increase in company value, and therefore shareholder wealth, which will be created by an investment.

Where cash flow patterns are **non-conventional**, for example cash flows change from positive to negative during the life of the project, there may be **several IRRs** which decision makers must be aware of to avoid making the wrong decision. When **discount rates** are **expected to differ** over the life of the project, such **variations** can be incorporated easily into **NPV** calculations, but not into IRR calculations.

Mutually exclusive projects are two or more projects from which only one can be chosen. Examples include the choice of a factory location or the choice of just one of a number of machines. The IRR and NPV methods can, however, give **conflicting rankings** as to which project should be given priority. Where there is a conflict, NPV always offers the **technically correct investment advice.**

Despite the advantages of the NPV method over the IRR method, the **IRR method** is **widely used** in practice.

22 Preparation question: Sensitivity analysis

(a)   **NPV calculation**

Year	Discount factor 9%	PV of initial investment $'000	PV of variable costs $'000	PV of cash inflows $'000	PV of net cash flow $'000
0	1.000	(11,000)			(11,000)
1	0.917		(2,934)	9,445	6,511
2	0.842		(2,694)	8,673	5,979
		(11,000)	(5,628)	18,118	1,490

The project has a positive NPV and would appear to be worthwhile.

Note. The NPV calculation is presented in this format to help the sensitivity calculation.

(b)   **Sensitivity of each project variable.**

(i)   **Initial investment**

$$\text{Sensitivity} = \frac{1,490}{11,000} \times 100\% = 13.5\%$$

(ii)   **Sales volume**

$$\text{Sensitivity} = \frac{1,490}{18,118 - 5,628} \times 100\% = 11.9\%$$

(iii) **Selling price**

$$\text{Sensitivity} = \frac{1,490}{18,118} \times 100\% = 8.2\%$$

(iv) **Variable costs**

$$\text{Sensitivity} = \frac{1,490}{5,628} \times 100\% = 26.5\%$$

(v) **Cost of capital.** We need to calculate the IRR of the project. Let us try discount rates of 15% and 20%. (9% produced a very positive NPV so the IRR must be much higher.)

Year	Net cash flow $'000	Discount factor 15%	PV $'000	Discount factor 20%	PV $'000
0	(11,000)	1	(11,000)	1	(11,000)
1	7,100	0.870	6,177	0.833	5,914
2	7,100	0.756	5,638	0.694	4,927
			NPV = 815		NPV = (159)

$$\text{IRR} = 15 + \left[\frac{815}{815 + 159} \times (20 - 15) \right] = 19.2\%$$

The cost of capital can therefore increase by 113% before the NPV becomes negative.

The elements to which the NPV appears to be **most sensitive** are the **selling price** followed by the **sales volume**. Management should thus pay particular attention to these factors so that they can be carefully monitored.

(c) The **weaknesses of sensitivity analysis** are:

(i) The method requires that **changes** in each key variable are **isolated.** However management is more interested in the combination of the effects of changes in two or more key variables.

(ii) Looking at factors in isolation is unrealistic since they are often **interdependent**.

(iii) Sensitivity analysis does not examine the **probability** that any particular variation in costs or revenues might occur.

(iv) **Critical factors** may be those over which managers have no control.

(v) In itself it does not provide a decision rule. Parameters defining **acceptability** must be laid down by managers.

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Text references. Dealing with risk is covered in Chapter 10.

Top tips. This question has four parts which include both written and numerical elements. Therefore a fair chance to show both skills. In part (a) you must define and distinguish risk and uncertainty. In parts (b) and (d) you need to know the techniques required.

Easy marks. In part (a), a general discussion of risk and uncertainty can get you up to 5 marks.

Examiner's comments. In part (a), many candidates did not draw an adequate distinction between risk (which can be quantified) and uncertainty (which cannot). Many obtained full marks in part (b), but candidates need to note that incremental fixed costs are relevant for any appraisal decision. The answers offered for part (c) were of variable quality, with only a small number of answers correctly evaluating the sensitivity of the project's NPV to changes in the specified variables. In part (d), the majority of candidates calculated the expected sales volume but did not comment on the ENPV. Few noted that the NPV of the worst case was negative, and that there was a 30% chance of this occurring. Some managers might regard a 30% chance of negative returns as an unacceptable risk. As in part (b), many candidates calculated and discounted itemised annual cash flows for each year of the project life, when an annuity factor approach would have saved a considerable amount of time.

		Marks
(a)	Discussion of risk	2
	Discussion of uncertainty	1
	Value of considering risk and uncertainty	<u>2</u>
		5
(b)	Calculation of payback period	2
	Discussion of payback period	<u>2</u>
		4
(c)	Calculation of net present value	2
	Sensitivity of NPV to sales volume	2
	Sensitivity of NPV to sales price	2
	Sensitivity of NPV to variable cost	1
	Discussion of sensitivity analysis	<u>3</u>
		10
(d)	Calculation of expected value of sales	1
	Calculation of expected net present value	1
	Discussion of expected net present value	<u>4</u>
		<u>6</u>
		<u><u>25</u></u>

(a) The terms **risk** and **uncertainty** are often used interchangeably but a distinction should be made between them. With risk, there are **several possible outcomes**, which upon the basis of past relevant experience, can be **quantified**. In areas of uncertainty, again there are several possible outcomes, but with little past experience, it will be **difficult to quantify** its likely effects.

A risky situation is one where we can say that there is a 70% probability that returns from a project will be in excess of $100,000 but a 30% probability that returns will be less than $100,000. If, however, no information can be provided on the returns from the project, we are faced with an uncertain situation. Managers need to exercise caution when assessing future cash flows to ensure that they make appropriate decisions. If a project is too risky, it might need to be rejected, depending upon the prevailing **attitude to risk**.

In general, risky projects are those whose future cash flows, and hence the project returns, are likely to be **variable**. The greater the variability is, the greater the risk. The problem of risk is more acute with capital investment decisions than other decisions because estimates of cash flows might be for several years ahead, such as for major construction projects. Actual costs and revenues may vary well above or below budget as the work progresses.

(b) Assuming that cash flows occur evenly throughout the year:

Contribution per unit = $3.00 – $1.65 = $1.35

Total contribution = 20,000 units × $1.35 = $27,000 per year

Annual cash flow = $27,000 – $10,000 = $17,000

Payback = $50,000/$17,000 = 2.9 years

This **exceeds** the company's **hurdle payback period** of two years. Payback is often used as a first screening method. By this, we mean that the first question to ask is: 'How long will it take to pay back its cost?' Umunat has a **target payback**, and so it might be tempted to reject this project. However, a project should not be evaluated on the basis of payback alone. If a project gets through the payback test, it ought then to be evaluated with a more sophisticated investment appraisal technique, such as NPV. Payback ignores the **timing of cash flows** within the payback period, the cash flows **after the end** of payback period and therefore the total project return. It also ignores the **time value of money** (a concept incorporated into more sophisticated appraisal methods).

(c)

Year	Investment $	Contribution $	Fixed costs $	Net $	Discount factor 12%	Total $
0	(50,000)			(50,000)	1.000	(50,000)
1-5		27,000	(10,000)	17,000	3.605	61,285
						11,285

NPV of sales revenue = 20,000 × $3.00 × 3.605 = $216,300
NPV of variable costs = 20,000 × $1.65 × 3.605 = $118,965
NPV of contribution = $97,335.

(i) **Sensitivity to sales volume**

For an NPV of zero, contribution has to decrease by $11,285. This represents a reduction in sales of 11,285/97,335 = 11.6%

(ii) **Sensitivity to sales price**

As before, for an NPV of zero, contribution has to decrease by $11,285. This represents a reduction in selling price of 11,285/216,300 = 5.2%

(iii) **Sensitivity to variable cost**

As before, for an NPV of zero, contribution has to decrease by $11,285. This represents an increase in variable costs of 11,285/118,965 = 9.5%

The basic approach of sensitivity analysis is to calculate the project's NPV under alternative assumptions to determine how sensitive it is to changing conditions. An indication is thus provided of those variables to which the NPV is most sensitive (critical variables) and the extent to which those variables may change before the investment results in a negative NPV.

Sensitivity analysis therefore provides an indication of why a project might fail. Management should review critical variables to assess whether or not there is a strong possibility of events occurring which will lead to a negative NPV. Management should also pay particular attention to controlling those variables to which the NPV is particularly sensitive, once the decision has been taken to accept the investment.

(d) Expected sales = (17,500 × 0.3) + (20,000 × 0.6) + (22,500 × 0.1) = 19,500 units

Expected contribution = 19,500 units × $1.35 = $26,325

Year	Investment $	Contribution $	Fixed costs $	Net $	Discount factor 12%	Total $
0	(50,000)			(50,000)	1.000	(50,000)
1-5		26,325	(10,000)	16,325	3.605	58,852
						8,852

The expected net present value is positive, but it represents a value that would never actually be achieved, as it is an amalgamation of various probabilities. Examining each possibility:

Worst case (sales of 17,500 units, 30% probability):

Year	Investment $	Contribution $	Fixed costs $	Net $	Discount factor 12%	Total $
0	(50,000)			(50,000)	1.000	(50,000)
1-5		23,625	(10,000)	13,625	3.605	49,118
						(882)

We already know the NPV of sales of 20,000 units to be $11,285

Best case (sales of 22,500, 10% probability):

Year	Investment	Contribution	Fixed costs	Net	Discount factor	Total
	$	$	$	$	12%	$
0	(50,000)			(50,000)	1.000	(50,000)
1-5		30,375	(10,000)	20,375	3.605	73,452
						23,452

The managers of Umunat will need to satisfy themselves as to the accuracy of this latest information, but the fact that there is a 30% chance that the project will produce a negative NPV could be considered too high a risk.

It can be argued that assigning probabilities to expected economic states or sales volumes gives the managers information to make better investment decisions. The difficulty with this approach is that probability estimates of project variables can carry a high degree of uncertainty and subjectivity.

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Text references. Investment appraisal is covered in Chapters 8 and 9 and risk in Chapter 10.

Top tips. In part (a), set out your workings clearly to gain the maximum number of marks for your workings. Do as much of the NPV calculation as you possibly can, as marks are awarded for each stage. Make an assumption and carry on if you get stuck on any part. Don't forget to comment on the acceptability of the proposed purchase in both parts (a) and (b).

Part (c) is a straightforward regurgitation of textbook knowledge.

Easy marks. There are plenty of easy marks available throughout this question provided you have done your revision thoroughly.

Examiner's comments. Many candidates gained very high marks in part (a).

A number of candidates lost straightforward marks by failing to comment on the calculated NPV, or by simply saying 'accept' without referring to the NPV decision rule. The reason for accepting an investment project must be clearly explained.

Many candidates gained full marks in part (b). Some candidates lost marks through the incorrect application of linear interpolation in calculating IRR. A number of candidates lost a straightforward mark by not commenting on their calculated IRR.

In part (c), many candidates were not able to explain the difference between risk and uncertainty in investment appraisal. Answers that offered numerical examples of sensitivity analysis or probability analysis gained credit, although candidates should note that sensitivity analysis is not a method of measuring or predicting risk.

Marking scheme

			Marks
(a)	After-tax weighted average cost of capital	2	
	Annual contribution	2	
	Fixed costs	1	
	Taxation	1	
	Capital allowance tax benefits	3	
	Scrap value	1	
	Discount factors	1	
	Net present value	1	
	Comment	1–2	
	Maximum		13

(b)	Net present value calculation	1	
	Internal rate of return calculation	2	
	Comment	1–2	
		Maximum	4

(c)	Risk and uncertainty	2–3	
	Discussion and sensitivity analysis	2–3	
	Discussion and probability analysis	2–3	
		Maximum	8
			25

(a) Weighted average cost of capital

$$\text{WACC} = \left[\frac{V_e}{V_e + V_d}\right] k_e + \left[\frac{V_d}{V_e + V_d}\right] k_d (1 - T)$$

$= (0.8 \times 11\%) + (0.2 \times 8.6\%(1 - 30\%)$

$= 8.8\% + 1.2\%$

$= 10\%$

Calculation of NPV

	1	2	3	4	5
	$'000	$'000	$'000	$'000	$'000
Contribution (W1)	440	550	660	660	
Fixed costs	(240)	(260)	(280)	(300)	
Net cash flow	200	290	380	360	
Taxation		(60)	(87)	(114)	(108)
CA tax benefits (W2)		60	45	34	92
Scrap value				30	
After-tax cash flow	200	290	338	310	(16)
Discount factor @10%	0.909	0.826	0.751	0.683	0.621
Present values	182	240	254	212	(10)

	$'000
PV of benefits	878
Investment	800
NPV	**78**

Workings

1

Year	1	2	3	4
Additional demand (kg)	400,000	500,000	600,000	700,000
Output of new machine	400,000	500,000	600,000	600,000
Contribution per kg (8 – 5 – 1.9)	1.10	1.10	1.10	1.10
Contribution per year	440,000	550,000	660,000	660,000

2

	Capital allowances			Tax benefits	
Year		$	Year		$
1	800,000 × 0.25 =	200,000	2	200,000 × 0.3 =	60,000
2	200,000 × 0.75 =	150,000	3	150,000 × 0.3 =	45,000
3	150,000 × 0.75 =	112,500	4	112,500 × 0.3 =	33,750
		462,500			
	Scrap value	30,000			
		492,500			
4	By difference	307,500	5	307,500 × 0.3 =	92,250
		800,000			

The acceptability of the proposed purchase

The net present value is **positive** so the proposed purchase is **financially acceptable**. However the machine has a maximum output of only 600,000 kg and additional demand **exceeds this** in the fourth year. The machine is also only viable for four years so more investment will be needed in the relatively short term. It would therefore be advisable to include these additional investment requirements in a **more detailed and longer reaching appraisal**.

It would also be advisable to look in more detail at **other issues** raised by this analysis. For example **constant selling prices and variable costs** have been assumed but it might be more realistic to build in an element of **inflation. Fixed costs** and demand may also increase in a **less linear**, controlled manner.

It is important to bring these issues into this project appraisal so that an informed decision can be made and uncertainties dealt with.

(b) **Internal rate of return**

	1	*2*	*3*	*4*	*5*
	$'000	$'000	$'000	$'000	$'000
After-tax cash flow	200	290	338	310	(16)
Discount factor @15%	0.870	0.756	0.658	0.572	0.497
Present values	174	219	222	177	(8)

	$
PV of benefits	784
Investment	800
NPV	**(16)**

$$IRR \approx a + \left(\left(\frac{NPV_a}{NPV_a - NPV_b} \right)(b - a) \right)\%$$

where a = 10%

$\quad\quad\quad b$ = 15%

$\quad\quad\quad NPV_a$ = 78

$\quad\quad\quad NPV_b$ = (16)

$$IRR \approx 10 + \left[\left(\frac{78}{78 + 16} \right) \times (15 - 10) \right]$$

$\quad\quad \approx 10 + 4.15$

$\quad\quad \approx 14.2\%$

The acceptability of the proposed purchase

The internal rate of return is approximately 14% which is **greater** than the 10% weighted average cost of capital used for investment appraisal by Duo Co. This means that the project is **financially acceptable** using the IRR criteria but the limitations of the NPV method discussed above also apply to IRR.

(c) **Risk and uncertainty**

Risk can be applied to a situation where there are several possible outcomes and, on the basis of past relevant experience, probabilities can be assigned to the various outcomes that could prevail. The risk of a project increases as the **variability of returns** increases.

Uncertainty can be applied to a situation where there are several possible outcomes but there is little past relevant experience to enable the probability of the possible outcomes to be predicted. Uncertainty increases as the **project life** increases.

Sensitivity analysis

The basic approach of sensitivity analysis is to **calculate the project's net present value** (NPV) under **alternative assumptions** to determine how sensitive it is to changing conditions. An indication is thus

provided of those variables to which the NPV is most sensitive (**critical variables**) and the **extent** to which those variables **may change** before the investment results in a negative NPV.

Sensitivity analysis therefore provides an indication of why a project might fail. Management should review critical variables to assess whether or not there is a strong possibility of events occurring which will lead to a negative NPV. Management should also pay particular attention to controlling those variables to which the NPV is particularly sensitive, once the decision has been taken to accept the investment.

Weaknesses of sensitivity analysis

The method requires that **changes** in each key variable are **isolated.** However management is more interested in the combination of the effects of changes in two or more key variables and looking at factors in isolation is unrealistic since they are often **interdependent**.

Sensitivity analysis does not examine the **probability** that any particular variation in costs or revenues might occur and **critical factors** may be those over which managers have no control.

Probability analysis

A **probability distribution** of 'expected cash flows' can often be estimated, recognising there are several possible outcomes, not just one. An **expected value of NPV** can be calculated and risk measured by calculating the **worst possible outcome** and its probability and/or the probability that the project will **fail to achieve a positive NPV.**

Weaknesses of probability analysis

An investment may be **one-off**, and 'expected' NPV may never actually occur. Also, **assigning probabilities** to events is highly **subjective.** Finally, expected values **do not evaluate the range** of possible NPV outcomes.

25 SC Co

Text references. Investment appraisal is covered in Chapters 8 and 9.

Top tips. Read the detail in the question very carefully so that you deal with each aspect of part (a) correctly. For example, the question specifies straight-line capital allowances, not reducing balance. For working capital, you need to calculate the initial and incremental amounts of investment. Working capital is recovered in the last two years of the investment. Make an assumption and carry on if you get stuck on any part.

Make sure you answer the specific requirements of the discussions in part (c) and (d) and do not just write everything you know about NPV.

Easy marks. Using the standard proforma for the calculations in part (a) will help you to gain easy marks even if you get stuck on the harder aspects. Part (b) should provide an easy three marks if you are sufficiently familiar with this technique.

Examiner's comments. Many answers to part (a) gained high marks and dealt correctly with most of the issues involved with the calculation. The treatment of working capital investment was a source of regular errors, however. Many answers put the investment in working capital at the end, rather than at the start, of each year, and included total investment rather than incremental investment. Another common error was to treat investment in working capital as tax-allowable (and even to call it a fixed cost), when in fact it has no tax effect at all.

Many answers gained high marks in part (b) and produced a result consistent with findings in part (a). Markers noted that some candidates made illogical choices of discount rates in their calculations, choosing to work for example with two negative NPV values, rather with one positive and one negative NPV value. While linear interpolation and linear extrapolation use the same mathematical approach, candidates should note that interpolation is more likely to be accurate than extrapolation in calculating IRR.

It was pleasing to note that very few candidates confused IRR with accounting rate of return (return on capital employed).

Part (c) asked for advice on the acceptability of the investment project and discussion of the limitations of the NPV and IRR evaluations performed. Most answers correctly advised on acceptability in terms that were consistent with their earlier evaluations. Many answers struggled to discuss the limitations of the evaluations in any depth, tending to offer one or two general criticisms of the NPV and IRR appraisal methods. Better answers discussed the limiting assumptions underlying the values selected for the project variables and the reasons why, for example, fixed costs had been omitted.

In part (d), few answers were able to explain why accepting positive NPV projects will increase shareholder wealth. A general discussion of the advantages of the NPV investment appraisal method over other investment appraisal methods was not asked for or required.

Marking scheme

		Marks	
(a)	Inflated sales revenue	2	
	Inflated variable costs	2	
	Capital allowances	2	
	Taxation	1	
	Working capital	3	
	Discount factors	1	
	Net present value calculation	1	
			12
(b)	Net present value calculation	1	
	Internal rate of return calculation	2	
			3
(c)	Net present value comment	1	
	Internal rate of return comment	1-2	
	Discussion of limitations	3-4	
	Maximum		5
(d)	Discussion of shareholder wealth maximisation	1-2	
	Link to share price maximisation	1-2	
	Discussion of NPV investment appraisal method	2-3	
	Maximum		5
			25

(a)   Calculation of NPV

	0	1	2	3	4
	$	$	$	$	$
Sales revenue (W1)		728,000	1,146,390	1,687,500	842,400
Variable costs (W2)		441,000	701,190	1,041,750	524,880
Contribution		287,000	445,200	645,750	317,520
Taxation @ 30%		(86,100)	(133,560)	(193,725)	(95,256)
Capital expenditure	(1,000,000)				
Working capital (W3)	(50,960)	(29,287)	(37,878)	59,157	58,968
Tax benefit of tax depreciation (W4)		75,000	75,000	75,000	75,000
Net cash flow	(1,050,960)	246,613	348,762	586,182	356,232
Discount factor @ 12%	1.000	0.893	0.797	0.712	0.636
Present value	(1,050,960)	220,225	277,963	417,362	226,564
NPV	**$91,154**				

Workings

1   *Sales revenue*

Year	1	2	3	4
Selling price ($\times$ 1.04)	$20.80	$21.63	$22.50	$23.40
Sales volume in units	35,000	53,000	75,000	36,000
Sales revenue	$728,000	$1,146,390	$1,687,500	$842,400

2   *Variable costs*

Year	1	2	3	4
Variable cost ($\times$ 1.05)	$12.60	$13,23	$13.89	$14.58
Sales volume in units	35,000	53,000	75,000	36,000
Variable cost	$441,000	$701,190	$1,041,75	$524,880

3   *Working capital*

Year	0	1	2	3	4
	$	$	$	$	$
Sales revenue	728,000	1,146,390	1,687,500	842,400	
Working capital requirement @ 7%	50,960	80,247	118,125	58,968	
Incremental working capital cash flow	(50,960)	(29,287)	(37,878)	59,157	58,968

4   *Tax benefit of tax depreciation*

Depreciation = $1,000,000/4 = $250,000 per year

Tax benefit = 30% $\times$ $250,000 = $75,000

(b)   **Calculation of internal rate of return**

Net cash flow	(1,050,960)	246,613	348,762	586,182	356,232
Discount factor @ 20%	1.000	0.833	0.694	0.579	0.482
Present value	(1,050,960)	205,429	242,041	339,399	171,704
NPV	**(92,387)**				

$$IRR \approx a + \left[\left(\frac{NPV_a}{NPV_a - NPV_b} \right)(b-a) \right] \%$$

$$IRR \approx 12 + \left[\frac{91,154}{91,154 + 92,387} \times (20-12) \right] \% = 16\%$$

(c)   **Acceptability of the proposed investment in product P**

The **NPV is positive** so the proposed investment can be recommended on financial grounds.

The **IRR is greater** than the **discount rate** of 12% used by SC Co for investment appraisal purposes so the proposed investment is again financially acceptable. The investment has **conventional cashflows** (an initial cash outflow followed by a series of inflows) and will therefore only have **one** IRR.

Limitations of the evaluations

Forecast sales volumes have been used for both investment appraisal methods and the accuracy of the results is therefore heavily dependant on the accuracy of these forecasts. Product P has a **short product life-cycle** which makes forecast sales volumes particularly unpredictable.

It would be useful to carry out '**what if**' and **sensitivity analysis** to give a more informed picture of what would happen if sales volumes were better or worse than predicted.

The analysis has used **predicted inflation rates** for sales price and variable costs which do not change over the four year period. This is unlikely in reality as price increases will vary according to **prevailing economic conditions** and **unexpected events**. Again, sensitivity analysis would help to assess the effects on the viability of the product if inflation was higher than expected.

Fixed costs have not been included in the investment appraisal. This is because SC has **spare capacity** in both space and labour terms so it is assumed that fixed costs will not change as a result of the investment. This assumption may be questionable in the longer term, especially as production of product P in Year 3 will be **double** that in Year 1.

(d) **The objective of maximising shareholder wealth**

The maximisation of shareholder wealth is usually assumed to be the **primary objective** of private sector companies.

Shareholder wealth comes from **dividends** and **capital gain** from the increase in the share price. The price of a company's shares will go up when the company makes attractive profits. However, these profits should be achieved without taking **business** and **financial risks** which worry shareholders.

The link to NPV

If a company undertakes an investment project with a positive NPV, the **market value** of the company should **increase by the amount of the NPV**. In theory, therefore, shareholder wealth is maximised if the company invests in all available projects with a positive NPV.

The **cost of capital** used in NPV calculations to discount cash flows represents the **rate of return** that investors expect to be paid for putting funds into the company. It is therefore the **minimum return** that a company should make from its own investments to earn the cash flows out of which investors can be paid their return.

However, the sometimes **long-term** nature of NPV may conflict with judgements on a business that are concerned with its (short-term) profits. **Managers' remuneration** may depend upon the level of annual profits, and they may thus be unwilling to risk large initial expenditure on a project that only offers good returns in the significantly uncertain long-term.

There may also be factors that help maximise wealth, but **cannot be quantified for NPV** purposes, for example investment in a loss-making project for strategic reasons such as obtaining an initial share in an important market.

26 Rupab Co

Text references. WACC is covered in Chapter 15, investment appraisal in Chapter 8 and CAPM in Chapter 15.

Top tips. This question should not cause too many problems provided you have practised the necessary techniques. Don't forget to use a proforma for the NPV and clearly show your workings. In part (c) you need to describe the technique rather than actually do the calculations so just imagine that you are calculating a project specific cost of capital and simply write an explanation of how to do it.

Easy marks. There are plenty of easy marks available in the straightforward calculations.

Examiner's comments. In part (a) there were a number of areas where marks were lost. Some candidates mistook the equity risk premium for the return on the market. Another error was to calculate the cost of debt by linear interpolation when, since the market value and the par value of the bond were the same, the cost of debt was equal to the bond interest rate. Some answers were unable to calculate the market values of equity and debt.

In part (b) many candidates were not able to deal correctly with initial investment, incremental investment and recovery of working capital. The initial investment was frequently mistimed, being placed in year one rather than at the start of the investment. The recovery of working capital was often omitted. Working capital was sometimes invested every year at its initial amount, or the inflated total investment in working capital was invested in full every year. Better candidates included in their cash flow forecast only the incremental annual investment.

Although the question specified straight-line capital allowances or tax-allowable depreciation, some candidates used the 25% reducing balance method. Credit cannot be given where the requirements of the question are ignored. Common errors with the treatment of tax included ignoring the fact that tax liabilities were one year in arrears; treating working capital investment as a tax-allowable deduction (it is not); giving tax benefits on the initial investment in addition to the benefit received through capital allowances; including capital allowances as a cash flow; and treating capital allowance tax benefits as a cost rather than a benefit.

Although the weighted average cost of capital from part (a) was already in nominal terms, some candidates treated as a real discount rate and used the Fisher equation to calculate a nominal discount rate. A clear understanding of the distinction between real and nominal terms approaches is required in investment appraisal.

In part (c), although many candidates were able to identify and discuss some limitation of the CAPM, these discussions often were very general in nature, rather than focussing on using the CAPM in investment appraisal. This reflected the inability of a number of candidates to explain correctly how the CAPM could be used to calculate a project specific discount rate. Better answers referred to proxy companies, ungearing equity betas to give proxy asset betas, averaging asset betas, regearing, and calculating a project-specific discount rate using the CAPM formula.

Some discussion of business risk and financial risk was also relevant here. Weaker answers often did little more than identify and describe the variables in the CAPM formula, before stating that these variables were subjective and hard to calculate, or that the CAPM was better than the dividend growth model, which was not relevant to the question asked. Some answers were very brief for the number of marks available.

Marking scheme

		Marks
(a)	Cost of equity	2
	Cost of debt	1
	Market value of equity	1
	Market value of debt	1
	WACC calculation	1
		6
(b)	Inflated cash flows	1
	Tax on cash flows	1
	Capital allowance tax benefits	1
	Working capital – initial investment	1
	Working capital – incremental investment	1
	Working capital – recovery	1
	NPV calculation	1
	Comment	1
		8
(c)	Explanation of use of CAPM	5-6
	Discussion of limitations	6-7
		11
		25

(a)   **Weighted average cost of capital**

Cost of equity = $R_f + \beta_i (E(r_m) - R_f)$

$$= 4{\cdot}5 + (1{\cdot}2 \times 5) = 10{\cdot}5\%$$

The company's bonds are trading at par and therefore the before-tax cost of debt is the same as the interest rate on the bonds, which is 7%.

After-tax cost of debt = $7 \times (1 - 0{\cdot}25) = 5{\cdot}25\%$

Market value of equity = 5m × $3·81 = $19·05 million

Market value of debt is equal to its par value of $2 million

$$\text{WACC} = \left[\frac{V_e}{V_e + V_d}\right] k_e + \left[\frac{V_d}{V_e + V_d}\right] k_d (1 - T)$$

$$\left[\left(\frac{19.05}{19.05+2}\right)\times10.5\%\right]+\left[\left(\frac{2}{19.05+2}\right)\times5.25\%\right]$$

= 9.5% + 0.5%

= 10%

(b) **Net present value calculation**

Year	0	1	2	3	4	5	6
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Cash inflows (W1)		700.4	721.4	743.0	765.3	788.3	
Tax on cash inflows @ 25%	_____	_____	(175.1)	(180.4)	(185.8)	(191.3)	(197.1)
		700.4	546.3	562.6	579.5	597.0	(197.1)
Tax benefit of capital allowances (W2)	_____		125.0	125.0	125.0	125.0	125.0
After-tax cash flows		700.4	671.3	687.6	704.5	722.0	(72.1)
Initial investment	(2,500.0)						
Working capital (W3)	(240.0)	(7.2)	(7.4)	(7.6)	(7.9)	270.1	_____
Net cash flows	(2,740.0)	693.2	663.9	680.0	696.6	992.1	(72.1)
Discount factor @ 10%	1.000	0.909	0.826	0.751	0.683	0.621	0.564
Present values	(2,740.0)	630.1	548.4	510.7	475.8	616.1	(40.7)
NPV	**0.4**						

Workings

1   *Inflated cash flows*

Year 1 = 680 × 1.03 = 700.4

Year 2 = 700.4 × 1.03 = 721.4

2   *Capital allowance tax benefits*

Annual capital allowance (straight-line basis) = $2.5m/5 = $500,000

Annual tax benefit = $500,000 × 0.25 = $125,000 per year

3   *Working capital*

Year	0	1	2	3	4	5	6
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Working capital (× 1.03)	240.0	247.2	254.6	262.2	270.1		
Incremental investment		(7.2)	(7.4)	(7.6)	(7.9)	270.1	

Comment

The net present value is positive and the investment is therefore **financially acceptable**. It is however only **marginally** positive and any change in the assumptions underlying the forecast data could easily turn the NPV into a negative value. For example, net cash flows are assumed to be constant in real terms and this is unlikely in reality.

(c) **A project specific discount rate**

If a company plans to invest in a project which involves **diversification into a new business**, the investment will involve a different level of **systematic risk** from that applying to the company's existing business. A discount rate should be calculated which is **specific** to the project, and which takes account of both the project's systematic risk and the company's gearing level. The discount rate can be found using the **capital asset pricing model** (CAPM).

The first step is to get an estimate of the systematic risk characteristics of the project's operating cash flows by obtaining **published beta values** for companies in the industry into which the company is planning to diversify.

The next step is to **adjust these beta values** to allow for the company's capital **gearing** level. This adjustment is done in two stages.

(i)   Convert the beta values of other companies in the industry to **ungeared betas**, using the formula:

$$\beta_a = \beta_e \left(\frac{V_e}{V_e + V_d(1-T)} \right)$$

(ii)   Having obtained an ungeared beta value β_a, **convert it back** to a **geared beta** β_e, which reflects the company's own gearing ratio, using the formula:

$$\beta_e = \beta_a \left(\frac{V_e + V_d(1-T)}{V_e} \right)$$

Having estimated a project-specific geared beta, the CAPM is used to estimate a project-specific cost of equity and a project-specific cost of capital, based on a weighting of this cost of equity and the cost of the company's debt capital.

Limitations of the CAPM

The practical limitation is **finding the required information.** It is difficult to identify other firms with **identical operating characteristics** and estimates of beta values from share price information are not wholly accurate. They are based on **statistical analysis of historical data**, and estimates using one firm's data will differ from estimates using another firm's data. If the firm for which an equity beta is being estimated has **opportunities for growth**, estimates of the equity beta based on other firms' data may be inaccurate.

It is **hard to estimate** returns on projects under different economic environments, market returns under different economic environments and the probabilities of the various environments. It may also be hard to determine the **risk-free rate of return**.

The **theoretical assumptions** underlying CAPM can also be criticised. It assumes a **perfect capital market** and that all investors have **diversified portfolios**. In reality, markets are at most only semi-strong efficient and investors are not always rational.

27 PV Co

> **Text reference**. Investment appraisal is covered in Chapters 7, 8 and 9.
>
> **Top tips.** Plan your answer to part (a) and use headings to give it a clear structure. In part (b), the NPV is positive at 10% so it is best to then use a second higher discount rate when calculating the IRR. This will give a more accurate result than using, say, 5%. Remember that you must use profit, not cash flow in a ROCE calculation, so you need to subtract total depreciation from the total net cash flow.
>
> **Easy marks.** The calculations in part (b) should be straightforward provided you have practised using the techniques.
>
> **Examiner's comments.** In part (a), better answers identified and discussed identification screening, analysis and evaluation, approving, implementation and monitoring. Poorer answers looked at different aspects of the analysis and evaluation stage, or went off track by discussing the relative merits of the investment appraisal methods required in part (b).
>
> In part (b) some candidates introduced capital allowances and taxation into their answers, but this was not required by the question. There is no point doing unnecessary calculations in the exam, as marks will be lost elsewhere due to time pressure. Most candidates calculated correctly the NPV, although some answers did not handle inflation correctly, or omitted the fixed costs, or calculated and used (unnecessarily) a real discount rate. Most candidates were not able to correctly calculate the ROCE. The most common error was using average annual net cash flow, rather than average annual accounting profit. Many candidates were able to calculate discounted payback, although some used an unnecessary amount of rounding eg giving 3 years rather than 2.9 years.
>
> In part (c) many candidates failed to recognise the superiority of the NPV method. Better answers gave reasons why ROCE cannot be relied upon.
>
> **ACCA examiner's answer**. The examiner's answer to this question is included at the back of this kit.

			Marks
(a)	Identification of decision-making stages	1-2	
	Explanation of decision-making stages	4-6	
	Role of investment appraisal	1-2	
		Maximum	7
(b)	Inflated income	2	
	Inflated operating costs	2	
	Discount factors	1	
	Net present value	1	
	Internal rate of return	3	
	Return on capital employed	2	
	Discounted payback	2	
			13
(c)	Discussion of investment appraisal findings	4	
	Advice on acceptability of project	1	
			5
			25

(a) **Key stages in the capital investment decision-making process**

A typical **model for investment decision making** has a number of distinct stages. Origination of proposals, project screening, analysis and acceptance, monitoring and review.

Origination of proposals

Investment proposals may come from an analysis of strategic choices, analysis of the business environment, research and development or legal requirements.

The overriding feature of any proposal is that it should be **consistent** with the organisation's **overall strategy** to achieve its **objectives**. Some alternatives will be rejected early on. Others will be more thoroughly evaluated.

Project screening

Each proposal must be subject to detailed screening. To enable a **qualitative evaluation** of a proposal to be made, a number of key questions might be asked before any financial analysis is undertaken. For example, what is the purpose of the project, does it 'fit' with the organisation's long-term objectives, does the project expose the organisation to unnecessary risk, how long will the project last and what factors are key to its success.

Only if the project passes this initial screening will more detailed financial analysis begin.

Analysis and acceptance

Investment proposals then need to be analysed in depth to determine which offer the most attractive opportunities. This analysis will include a **financial analysis** of the project, a comparison of the outcome of the financial analysis to predetermined acceptance criteria and a consideration of the project in the light of the capital budget for the current and future operating periods.

The most suitable proposals are then passed to a senior authority for consideration and **approval**. Go/no go decisions on projects may be made at different levels within the **organisational hierarchy**, depending on the type of investment, its perceived riskiness and the amount of expenditure required.

Monitoring and review

During the project's progress, **project controls** should be applied to ensure that capital spending does not exceed the amount authorised, the implementation of the project is not delayed and the anticipated benefits are eventually obtained.

(b)   (i)   **Calculation of NPV**

Year	0	1	2	3	4
	$	$	$	$	$
Investment	(2,000,000)				
Income (W1)		1,236,000	1,485,400	2,622,000	1,012,950
Operating costs (W2)		(676,000)	(789,372)	(1,271,227)	(620,076)
Net cash flows	(2,000,000)	560,000	696,028	1,350,773	392,874
Discount factor 10%	1.000	0.909	0.826	0.751	0.683
Present value	(2,000,000)	509,040	574,919	1,014,430	268,333
NPV	**366,722**				

Workings

(1)   Calculation of income

Year	1	2	3	4
Inflated selling price ($/unit)	20.60	21.22	21.85	22.51
Demand (units/year)	60,000	70,000	120,000	45,000
Income ($/year)	1,236,000	1,485,400	2,622,000	1,012,950

(2)   Calculation of operating costs

Year	1	2	3	4
Inflated variable cost ($/unit)	8.32	8.65	9.00	9.36
Demand (units/year)	60,000	70,000	120,000	45,000
Variable costs ($/year)	499,200	605,500	1,080,000	421,200
Inflated fixed costs ($/year)	176,800	183,872	191,227	198,876
Operating costs ($/year)	676,000	789,372	1,271,227	620,076

(ii)   **Calculation of IRR**

Year	0	1	2	3	4
	$	$	$	$	$
Net cash flow	(2,000,000)	560,000	696,028	1,350,773	392,874
Discount factor 20%	1.000	0.833	0.694	0.579	0.482
Present values	(2,000,000)	466,480	483,043	782,098	189,365
NPV	**(79,014)**				

$$IRR = a + \left(\left(\frac{NPV_a}{NPV_a - NPV_b} \right)(b-a) \right)\%$$

$$\textbf{IRR} = 10 + \left[\frac{366,722}{366,722+79,014} \times (20\text{-}10) \right]\% = \textbf{18.2\%}$$

(iii)   **Calculation of ROCE**

Total cash inflow = 560,000 + 696,028 + 1,350,773 + 392,874
        = $2,999,675

Total depreciation = initial investment as there is no scrap value
Total accounting profit = 2,999,675 – 2,000,000
        = $999,675

Average annual accounting profit = 999,675/4
        = $249,919

Average investment = 2,000,000/2

= $1,000,000

ROCE = 249,919/1,000,000 × 100

= **25%**

(iv) **Calculation of discounted payback**

Year	0	1	2	3
	$	$	$	$
Present value of cash flows	(2,000,000)	509,040	574,919	1,014,430
Cumulative PV	(2,000,000)	(1,490,960)	(916,041)	98,389

Discounted payback period = 2 + (916,041/1,014,430)

= **2.9 years**

(c) **NPV**

The investment proposal has a positive NPV of $366,722 and is therefore **financially acceptable**. The NPV decision rule will always give the **correct investment advice** on financial grounds.

IRR

The result of the IRR calculation also indicates that the investment proposal is acceptable as the calculated IRR of 18.2% is **higher** than the 10% **return required** by PV Co. If the IRR result had been less than 10%, the NPV result would still have been preferred.

ROCE

The calculated ROCE of 25% is **less** than the target return of 30% but this is not a reliable method compared to NPV. The hurdle rate appears to be too high and may be **out of date**.

Discounted payback

There is no target given for a payback period but payback is expected to be well into the lifecycle of the project. The project's lifecyle is quite **short** at 4 years and it would therefore be useful to conduct a **sensitivity analysis** of demand to ensure the risk is acceptable.

Conclusion

The NPV and IRR both indicate that the project is financially acceptable, and subject to further analysis of the risks of the project, it should go ahead.

28 AGD Co

Text references. Leasing is covered in Chapter 11.

Top tips. This question is in three parts. Nearly 50% of the marks are available for a purchase or lease investment appraisal and a further eight marks for a discussion of operating and finance leases.

The reminder of the marks, five in total, can be earned for a tail end two-part question requiring you to calculate APRs and repayments of loans.

All three parts could be answered separately.

Easy marks. The question is split into two smaller calculation elements in part (c)that will gain you easy marks if you know how to calculate APRs and repayments. The written part allows you to list what you know of both types of lease but you need to note the differences as required in the question. Look at using pro forma workings for the investment appraisal in part (a).

Examiner's comments. While many candidates made errors in this popular question, answers were usually of a satisfactory overall standard. Common errors included timing the investment when borrowing to buy as occurring at the end of the first year, omitting the tax savings on the maintenance costs incurred by buying the asset, and omitting the tax savings on the lease rental payments.

The overall standard of answers to part (b) was not strong and many candidates used a 'double-list' approach that supports contrast rather than discussion. A degree of confusion between finance leasing and lease-purchase was in evidence, but this was dealt with sympathetically.

Many candidates either did not answer part (c) or gave answers that were incorrect. The overall standard of answers was very poor.

Marking scheme

			Marks
(a)	Purchase price	1	
	Sale proceeds	1	
	Capital allowances	1	
	Balancing allowance	1	
	Capital allowance tax benefits	1	
	Maintenance costs	1	
	Maintenance cost tax benefits	1	
	NPV of borrowing to buy	1	
	Lease rentals	1	
	Lease rental tax benefits	1	
	NPV of leasing	1	
	Selection of cheapest option	1	12
(b)	Explanation and discussion		
	Finance lease	4-5	
	Operating lease	4-5	
		Maximum	8
(c)	Annual percentage rate	2	
	Amount of equal instalments	3	
			5
			25

(a) (i) **Net present value of purchasing machine**

	Year 0 $'000	Year 1 $'000	Year 2 $'000	Year 3 $'000	Year 4 $'000
Cash outflows					
Capital costs	(320)				
Annual maintenance costs		(25)	(25)	(25)	
	(320)	(25)	(25)	(25)	0
Cash inflows					
Disposal proceeds				50	
Taxation (at 30% in following year)			8	8	8
Writing down allowances (W)			24	18	39
			32	76	47
Net cash flows	(320)	(25)	7	51	47
Discount at 7%	1.000	0.935	0.873	0.816	0.763
PV of cash flow	(320)	(23)	6	42	36
NPV of cash flow	**$259,000**				

Working

Writing down allowances

	$'000	Capital allowance $'000	Tax benefit $'000	Year of cash flow
Initial investment	320			
Allowances at 25% pa on a reducing balance basis over 3 years				
Year 1	(80)	(80)	24	Y2
	240			
Year 2	(60)	(60)	18	Y3
	180			
Year 3				
Proceeds on sale	(50)			
Balancing allowance	130		39	Y4

(ii) **Net present value of leasing machine**

	Year 0 $'000	Year 1 $'000	Year 2 $'000	Year 3 $'000	Year 4 $'000
Cash outflows					
Annual lease rentals	(120)	(120)	(120)		
	(120)	(120)	(120)		
Cash inflows					
Taxation (at 30% in following year) – tax deduction for lease rentals			36	36	36
Net cash flows	(120)	(120)	(84)	36	36
Discount at 7%	1.000	0.935	0.873	0.816	0. 763
PV of cash flow	(120)	(112)	(73)	29	27
NPV of cash flow	**$249,000**				

Therefore the machine should be **leased** rather than purchased.

(b) **Key differences between operating and finance leases**

Finance lease

A finance lease is an agreement between the user of the leased asset and a provider of finance that covers the majority of the asset's useful life.

Key features of a finance lease

(i) The provider of finance is usually a **third party finance house** and not the original provider of the equipment.

(ii) The **lessee is responsible for the upkeep**, servicing and maintenance of the asset.

(iii) The lease has a **primary period**, which covers all or most of the useful economic life of the asset. At the end of the primary period the lessor would not be able to lease the equipment to someone else because it would be worn out.

(iv) It is common at the end of the primary period to allow the lessee to continue to lease the asset for an indefinite **secondary period**, in return for a very low nominal rent, sometimes known as a 'peppercorn' rent.

(v) The lessee bears most of the risks and rewards and so the asset is shown on the lessee's balance sheet.

Operating leases are rental agreements between a lessor and a lessee

Key features of an operating lease

(i) The lessor supplies the equipment to the lessee.

(ii) The **lessor is responsible for the upkeep**, servicing and maintenance of the asset.

(iii) The lease period is fairly short, less than the expected economic life of the asset. At the end of one lease agreement the lessor can either lease the same equipment to someone else and obtain a rent for it or sell it second-hand.

(iv) The asset is not shown on the lessee's balance sheet.

(c) (i) **Annual percentage rate (APR)** on a 10% loan by the bank with two six-monthly interest payments.

As interest is due every six months, this is equivalent to 5% every six months.

As this would be compounded, therefore the APR would be $(1.05 \times 1.05 - 1) = 0.1025$ or 10.25%

(ii) The term of the loan is $320,000 at 10% pa over 5 years with six-monthly payments of interest.

In (i) above, we established that the rate was 5% every six months. There are 10 equal payments due. Treating this as an annuity at 5% over 10 periods gives a discount rate of 7.722.

Therefore dividing $320,000/7.722 gives **$41,440** as each equal payment due.

29 Leaminger Co

> **Text references.** Leasing and capital rationing are covered in Chapter 11.
>
> **Top tips.** Make sure you take into account all the detail given in the question; it's easy to miss or misinterpret the timing of flows or the maintenance costs. Note that annuity factors can be used to save time in (a) (ii) and (iii), whereas in (a) (i) a more complicated calculation is required. Most points in the NPV calculation were worth 1 mark, although 3 marks were available for the capital allowances.
>
> The key point in (b) is that capital rationing affects the purchase and operating lease options, but does not affect the finance lease option since the first payments do not take place until capital rationing has ended.
>
> **Examiner's comment.** There were a number of errors in (a) that many candidates made including: omitting maintenance costs and their tax benefits from the purchase and finance lease calculations; including the writing down allowance rather than the tax benefit of the writing down allowance in the purchase calculation; including the tax benefits of writing down allowances in the lease calculations (they were only available on ownership); only considering one year of the operating lease.
>
> In (b) few candidates recognised the opportunity cost element in the purchase and operating lease options. Candidates gained marks for using a profitability index approach. Many answers in (c) just consisted of a discussion of hard and soft capital rationing. Few candidates considered the short-term cash flows, the cost of capital, the possibility of failure to renew the operating lease, other alternatives to immediate purchasing and other sources of finance.

(a) (i) **Purchase**

	20X2 $	20X3 $	20X4 $	20X5 $	20X6 $	20X7 $
Purchase price	(360,000)					
Rental		(15,000)	(15,000)	(15,000)	(15,000)	
Tax on rental			4,500	4,500	4,500	4,500
Tax allowable depreciation (W)		27,000	20,250	15,188	11,391	28,172
Disposal proceeds					20,000	
Net cash flow	(360,000)	12,000	9,750	4,688	20,891	32,672
Discount factor	1.000	0.909	0.826	0.751	0.683	0.621
Present value	(360,000)	10,908	8,054	3,521	14,269	20,289

Net present value = **$(302,959)**

Working

Tax allowable depreciation

Year of claim	Depreciation	Tax saved	Year of tax payment/saving
	$	$	
20X2	90,000	27,000	20X3
20X3	67,500	20,250	20X4
20X4	50,625	15,188	20X5
20X5	37,969	11,391	20X6
20X6	93,906	28,172	20X7

Depreciation

20X2	360,000 × 25% = 90,000
20X3-5	75% of previous year
20X6	Balancing allowance = Purchase price – Depreciation – Sale proceeds
	= 360,000 – 90,000 – 67,500 – 50,625 – 37,969 – 20,000
	= 93,906

(ii) Finance lease

Year		Cash flow	Discount factor	Present value
		$	10%	$
20X3-6	Rental and maintenance			
	(135,000 + 15,000)	(150,000)	3.170	(475,500)
20X4-7	Tax on payments	45,000	2.882*	129,690
	Present value			(345,810)

20X4-7 factor = Year 1-5 Factor – Year 1 Factor
= 3.791 – 0.909
= 2.882

(iii) Operating lease

Year		Cash flow	Discount factor	Present value
		$	10%	$
20X2-5	Rental	(140,000)	3.487	(488,180)
20X3-6	Tax on rental	42,000	3.170	133,140
	Present value			(355,040)

Based on these calculations, **purchase** would appear to be the best option.

(b) Every $ of year 0 expenditure will involve a loss of profit of 100,000/500,000 = 20c

Purchase

	$
Present value	(302,959)
Profits foregone (360,000 × 0.20)	(72,000)
Revised present value	(374,959)

Finance lease

$345,810 as before.

Operating lease

	$
Present value	(355,040)
Profits foregone (140,000 × 0.20)	(28,000)
Revised present value	(383,040)

If capital rationing applies, the finance lease is the best option.

(c)   REPORT

       To: Directors
       From: Business Adviser
       Date: 14 November 20X2
       Subject: Acquisition of turbine

This report covers the issues influencing the decision to acquire the turbine.

Effect of capital rationing

Without capital rationing, the most economic decision would be to purchase the turbine; with capital rationing taking out a finance lease would appear to be the best decision.

Continued capital rationing

However this analysis assumes capital rationing only lasts for a single period. Existence of capital rationing in future periods will mean a greater loss of profits if we have used lease finance (because rentals have to be paid), than if the machine is purchased outright (where the only costs after initial purchase are maintenance costs).

Postponement of purchase decision

The implications of taking out an operating lease until the period of capital rationing has ended and then purchasing a new turbine need to be investigated. Maybe a turbine purchased in a couple of years' time will incorporate technological advances and thus be able to be used beyond 20X6.

Cash flow patterns

Cash flow patterns may be a significant factor in the financing decision. The purchase option requires a significant upfront cash payment. The rental cash flows are evenly spread over the next few years.

Cost of capital

Connected to the last point, the current cost of capital may not be appropriate for assessing the decision, if new sources of finance are needed, particularly to provide short-term funds if acquisition results in a cash shortage. The financial risk of the company may change as a result.

Renewal of operating lease

We need to assess the possibility that the operating lease will not be renewed by the lessor or the rentals raised significantly. However using an operating lease does give us the flexibility to cancel the arrangement if business conditions change.

Problems with the turbine

If the turbine breaks down, the lessor will have to deal with the problems if Leaminger has taken out an operating lease, but the company will have to solve the problems and incur costs if it uses a finance lease or purchases the machine outright. If the warranty has expired when the problems arise, Leaminger could incur significant extra costs.

30 Preparation question: Bread Products Co

Text references. Asset replacement decisions are covered in Chapter 11.

Top tips. In part (a), we have shown you two methods, you should choose whichever method you find easiest. The large number of marks available in (b) indicated that the points you raised needed to be discussed in a degree of depth; one-line answers would not have been enough.

(a)   In order to compare the replacement policies, we must calculate the costs of each approach over a number of complete cycles. The timescale to be used will be the lowest common multiple of the lifecycles, ie $2 \times 3 = 6$ years.

       All costs and revenues will be inflated into nominal terms, and then discounted at the nominal rate of 15%.

The first stage is to calculate the nominal costs and revenues over the six year period, and then to apply 15% discount factors to find the NPV cost of each policy.

Replace every two years (Revenues shown as credits)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Oven purchase (+ 5% pa)	24,500		27,011		29,780		
Maintenance (+ 10% pa)		550	968	666	1,171	805	1,417
Resale proceeds (+ 5% pa)			(17,199)		(18,962)		(20,905)
Total cash flow	24,500	550	10,780	666	11,989	805	(19,488)
15% discount factors	1.000	0.870	0.756	0.658	0.572	0.497	0.432
PV cash flow	24,500	479	8,150	438	6,858	400	(8,419)
Total PV cost over 6 years	32,406						

Replace every three years (Revenues shown as credits)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Oven purchase (+ 5% pa)	24,500			28,362			
Maintenance (+ 10% pa)		550	968	1,997	732	1,288	2,657
Resale proceeds (+ 5% pa)				(12,965)			(15,009)
Total cash flow	24,500	550	968	17,394	732	1,288	(12,352)
15% discount factors	1.000	0.870	0.756	0.658	0.572	0.497	0.432
PV cash flow	24,500	479	732	11,445	419	640	(5,336)
Total PV cost over 6 years	32,879						

A two year replacement cycle is to be preferred since this costs the least in present value terms.

Alternative method

Replace every two years

	Year 0	Year 1	Year 2
Oven purchase	(24,500)		
Maintenance (+10% pa)		(500)	(968)
Resale proceeds (+5% pa)			17,199
Net	(24,500)	(550)	16,231
Discount factor @ 15%	1.000	0.870	0.756
PV	(24,500)	(479)	12,271
NPV	(12,708		
2 year annuity factor	1,626		
Equivalent annual cost	(7,815)		

Replace every three years

	Year 0	Year 1	Year 2	Year 3
Oven purchase	(24,500)			
Maintenance (+10% pa)		(550)	(968)	(1,997)
Resale proceeds (+5% pa)				12,965
Net	(24,500)	550	(968)	10,968
Discount factor @ 15%	1.000	0.870	0.756	0.658
PV	(24,500)	(479)	(732)	7,217
NPV	(18,493)			
3 year annuity factor	(2.284)			
Equivalent annual cost	(8,097)			

(b)   **Limitations of net present value techniques**

(i)   **Shareholder wealth maximisation**

NPV is based on the **assumption that the primary aim of the organisation is to maximise the wealth of the ordinary shareholders**. This is valid for many companies, but in some investment decisions there may be other overriding factors that make the NPV approach less relevant. This is

particularly true when the investment under consideration is fundamental to the strategic direction of the business.

(ii) **Public sector problems**

The technique is **difficult to apply in the public sector**, partly due to methods of accounting, and partly because other organisational aims will be more important than the maximisation of profit. Public sector operations are commonly judged in terms of economy, efficiency and effectiveness, and the NPV approach can only provide a partial answer to these issues.

(iii) **Discount rate**

A major problem in the use of NPV in practice is the **choice of the discount rate**. It is generally accepted that the rate to be used should be the cost of capital, but this in itself may be difficult to determine. The problem is particularly tricky when the size of the investment means that the company will need to acquire a significant amount of additional capital, and there is uncertainty about the cost of new funds.

(iv) **Risk**

A related problem to the choice of the discount rate is the **incorporation of risk**. The simplest approach is to apply a risk premium to the cost of capital, but the amount of this is subjective. Other approaches include the use of sensitivity analysis and probability analysis, but these too have limitations, and involve the use of subjective judgements.

(v) **Subjectivity**

It follows from (iv) that NPV techniques may appear to be very scientific and rational whereas in fact there is a large component of subjectivity in the assumptions and forecasts used. However, this **subjectivity is masked** by the precise format in which results are communicated.

(vi) **Cash flow timing**

The technique **assumes that all cash flows arise at the end of the time period** (which is usually one year). This is obviously untrue, and large fluctuations in this pattern may distort the results. Breaking the analysis down into small periods leads to complication, and may be unsatisfactory due to the problems of forecasting in such a precise way.

(vii) **Long-term measure**

Although the NPV approach may lead to the correct financial decision in the long-term, this **timescale may be too long** to be appropriate for the business to use in practice. For example, it could lead to an unacceptable reduction in short-term accounting profits which will impact upon the share price and on confidence in the company. Similarly, it may conflict with incentive arrangements for managers, which are usually geared to short-term profitability.

(viii) **Non quantifiable costs and benefits**

Some costs and benefits that arise are not quantifiable. There may be important non-financial factors that are relevant to the decision, but which are difficult to quantify. For example, undertaking a new investment may enhance the standing of the company, making it more attractive to customers, investors and potential employees. This could have an important impact on the performance of the company, but cannot be quantified in an NPV analysis.

31 Filtrex Co

> **Text references.** Capital rationing is covered in Chapter 11.
>
> **Top tips.** (a) is a good summary of why long-term profits don't always lead to positive cash flows. (b) demonstrates why capital rationing may be a matter of choice; certain sources of funds may not be felt desirable and projects have to be properly controlled.
>
> (c)(i) of the question can be approached by means of the Profitability Index (PI); the optimal mix of project can then be found by trial and error. In addition you need to be clear about mutual exclusivity and indivisibility. Mutual exclusivity means that if you choose one project, you cannot choose other projects with which the chosen project is mutually exclusive. Indivisibility means that you cannot carry out part of a project; it is all or nothing.
>
> In (d) it is helpful to consider the situation from the point of view of developing the projects themselves and in terms of alternative sources of funds.

(a) **Cash shortages**

   A period of capital rationing is often associated with more general problems of cash shortage. Possible reasons for this include the following.

   (i)   The business has become **loss making** and is unable to cover the depreciation charge. Since one purpose of the depreciation charge is to allow for the cost of the assets used in the profit and loss account, the implication is that there will be insufficient cash with which to replace these assets when necessary.

   (ii) High inflation may mean that even though the business is profitable in historical cost terms, it is still failing to **generate sufficient funds** to replace assets.

   (iii) If the business is growing it may face a **shortage of working capital** with which to finance expansion, and this may result in a period of capital rationing.

   (iv) If the business is **seasonal or cyclical** it may **face times of cash shortage** despite being fundamentally sound. In this situation, there may be a periodic need for capital rationing.

   (v)   A **large one-off item** of **expenditure** such as a property purchase may mean that the company faces a temporary shortage of cash for further investment.

   Investment opportunities

   A further reason for capital rationing arises in the situation where the company has **more investment opportunities** available than the **funds allocated** to the capital budget permit. This means that projects must be ranked for investment, taking into account both financial and strategic factors.

(b) **Hard capital rationing**

   Hard capital rationing describes the situation when a firm is prevented from undertaking attractive investments for reasons external to the firm.

   Soft capital rationing

   Soft capital rationing describes the position when management places a limit on the amount of capital investment that may be undertaken: it is due to factors internal to the firm.

   Reasons for the deliberate restriction of capital expenditure include the following.

   (i)   Management may decide to **limit the funds available** to those which can be generated from retained earnings, for the following reasons.

      (1)   They **do not wish** to **issue further equity** to prevent outsiders from gaining control of the business.

      (2)   They **do not wish** to **raise further equity** to avoid earnings dilution.

      (3)   They **do not wish to commit the company** to meeting large fixed interest payments on additional debt capital.

   (ii) A **capital budgeting procedure** may be used to ensure that only the best projects are undertaken.

(iii) The **number of projects** undertaken may be **restricted** in order to ensure that there are adequate management resources available for them to realise their full potential.

(c) (i) **Profitability index**

When resources are limited, the aim must be to maximise the productivity of the scarce resource, in this case capital. It is therefore helpful to calculate the **Profitability Index (PI)** for each project to determine which delivers the most NPV per dollar of investment.

Project	Outlay	NPV	PI(NPV/Outlay)
	$	$	
A	150,000	65,000	0.43
B	120,000	50,000	0.42
C	200,000	80,000	0.40
D	80,000	30,000	0.38
E	400,000	120,000	0.30

On this basis, project A is the most attractive since it shows the highest PI, and project E is the least attractive. Since the projects are not divisible and projects A and C are mutually exclusive it is not possible simply to work down the rankings to determine the optimum combination. Instead this must be done algebraically or by trial and error. Various combinations of projects can be evaluated using the latter approach.

	Outlay	NPV
	$	$
A, B, D	350,000	145,000
B, C, D	400,000	160,000
E	400,000	120,000

It appears that the **optimum combination** of projects is B, C and D. As well as delivering the highest NPV it also has the **benefit that all the funds available** for investment are used and Filtrex does not face the choice between investments showing a poorer return or returning excess funds to its shareholders.

(ii) **Useful further information**

(1) The **possibility** of **raising additional finance** and at what cost.

(2) If **rationing** is to continue, then the **effect on the NPV** of **postponing projects becomes relevant**. If all the projects are equally postponable than Filtrex should select those which provide the fastest flow of funds in order to finance those which have been postponed as quickly as possible.

(3) It has been assumed that all the projects carry a **similar degree of risk**. If this is not the case then Filtrex should allow for this, for example by the use of sensitivity analysis in its evaluations.

(4) It may be that some of the projects carry a **greater strategic significance** than others. Information on this area should also be taken into account in the investment decision.

(d) **Further opportunity**

Filtrex might consider some of the **following options** as a means of exploiting more of these opportunities.

(i) **Sale of patent rights**

It could accept that it will be **unable to manage** all the **later stages** of development itself and could decide to sell some of the patent rights once they have been obtained.

(ii) **Joint ventures**

It could seek **joint venture partners** to share in the development.

(iii) **Licensing or franchising**

Some of the areas may be appropriate **for licensing or franchising** with a royalty being payable to Filtrex. This in turn could help to finance the development of those projects which are retained for in-house promotion.

(iv) **Additional finance**

It could seek additional finance in the following forms.

(1) **Further equity** by way of a rights issue or, by agreement with existing shareholders, via a public issue.

(2) **Debt finance secured** on the **assets**. This should be possible since the company is currently ungeared.

(3) **Debt finance secured** against the **working capital** ie factoring or invoice discounting.

(4) It may be possible to arrange a **sale and leaseback** of some of the company's property or equipment.

(5) Depending on its location and business there may be the possibility of applying for **grant aid**, for example from one of the EU regional development funds.

32 Basril Co

Text references. Capital rationing is covered in Chapter 11.

Top tips. In part (a) calculate the NPVs for each project first and then look at the best combination of divisible or indivisible projects. Part (b) just needs a short answer. Part (c) needs a longer explanation of capital rationing and the use of key terms as highlighted in the answer. Part (d) asks you to explain and how you apply relevant cashflow calculations in investment appraisal.

Easy marks. Setting out formats for calculating NPVs in part (a). In part (c) providing definitions of hard and soft capital rationing.

Examiner's comments. This question asked for optimal selection under capital rationing, an explanation of how NPV is applied under capital rationing, a discussion of the causes of capital rationing, and an explanation of the term 'relevant cost' in the context of investment appraisal.

Part (a), required three projects with a variety of cash flow profiles to be evaluated. Good answers calculated the NPV and profitability index, and gave the optimum investment schedule and total NPV for the cases of divisible and non-divisible projects. Errors included: failing to calculate profitability indexes, not calculating the total NPV (even though required by the question), failing to account correctly for inflation in the case of the project where real cash flows were provided (inflating real cash flows to money terms or deflating the nominal rate were both acceptable), and using annuity factors rather than discount factors in calculations.

Marking scheme

				Marks
(a)	(i)	NPV of project 1	1	
		NPV of project 2	1	
		NPV of project 3	2	
		Calculation of profitability indices	2	
		Optimum investment schedule	2	
	(ii)	Selection of optimum combination	2	
				10
(b)		NPV decision rule	1	
		Link to perfect capital markets	1	
		Explanation to ranking problem and solution	1	
				3

(c)	Hard capital rationing	3	
	Soft capital rationing	4	
			7
(d)	Explanation of relevant cash flows	2	
	Examples of relevant cash flows	3	
			5
			25

(a) (i)

Project 1

	$	12% discount factor	$
Initial investment	(300,000)	1	(300,000)
Year 1	85,000	0.893	75,905
Year 2	90,000	0.797	71,730
Year 3	95,000	0.712	67,640
Year 4	100,000	0.636	63,600
Year 5	95,000	0.567	53,865
			32,740
Profitability	332,740/300,000		1.11

Project 2

	$	12% discount factor	$
Initial investment	(450,000)	1	(450,000)
Year 1	140,800	0.893	125,734
Year 2	140,800	0.797	112,218
Year 3	140,800	0.712	100,250
Year 4	140,800	0.636	89,549
Year 5	140,800	0.567	79,834
			57,585
Profitability	507,585/450,000		1.13

Project 3

	$	12% discount factor	$
Initial investment	(400,000)	1	(400,000)
Year 1	124,320	0.893	111,018
Year 2	128,796	0.797	102,650
Year 3	133,432	0.712	95,004
Year 4	138,236	0.636	87,918
Year 5	143,212	0.567	81,201
			77,791
Profitability	477,791/400,000		1.19

The most profitable projects are Projects 3 and 2, so if they are **divisible** it is suggested that Basril invests $400k in Project 3 for an NPV of $77,791, and the remaining $400k in Project 2 for an NPV of 400/450 × $57,584 = $51,186.

(ii) If the projects are **indivisible**, then Basril can either invest in Project 1 + Project 2 at a cost of $750,000, or Project 1 + Project 3 at a cost of $700,000 (Project 2 + Project 3 would cost too much). The NPV of 1 + 2 = $32,740 + $57,584 = $90,324. The NPV of 1 + 3 = $32,740 + $77,791 = $110,531. Therefore the best combination is Projects 1 and 3.

Examiner's comments. Part (b) required a discussion of how the NPV approach is applied via the profitability index in the case where capital is rationed and projects are divisible, and via the NPV of possible combinations in the case where projects are indivisible. Other valid answers discussed single-period and multiple period capital rationing, and linear programming as a solution in multiple-period capital rationing.

(b)   When capital is rationed, a company cannot invest in every opportunity that comes its way with a positive NPV. The basic approach in such circumstances is to rank all investment opportunities so that the NPVs can be maximised from the use of the available funds.

Ranking in terms of absolute NPVs will normally give incorrect results, because it leads to the selection of large projects, each of which has a high individual NPV but which may have, in total, a lower NPV than a large number of smaller projects with lower individual NPVs.

Ranking should therefore be carried out in terms of what is called the profitability index. This ratio measures the present value of future cash flows per $1 of investment, and so indicates which investments make the best use of the limited resources available. Projects may or may not be divisible when performing this analysis. Different combinations of projects will need to be assessed.

Examiner's comments. Part (c) asked candidates to explain the causes of capital rationing, and many answers discussed hard and soft capital rationing, as well as offering examples of each. Credit was given to answers that explained in more general terms why a company might find its investment funds to be restricted, as long as the reasons had credibility.

(c)   **Capital rationing** is a situation in which a company has a limited amount of capital to invest in potential projects, such that the different possible investments need to be compared with one another in order to allocate the capital available most effectively. If an organisation is in a capital rationing situation it will not be able to enter into all projects with positive NPVs because there is not enough capital for all of the investments.

Soft capital rationing is brought about by internal factors; **hard capital rationing** is brought about by external factors.

Soft capital rationing may arise for one of the following reasons.

(i)   Management may be reluctant to issue additional share capital because of concern that this may lead to outsiders gaining control of the business.

(ii)   Management may be unwilling to issue additional share capital if it will lead to a dilution of earnings per share.

(iii)   Management may not want to raise additional debt capital because they do not wish to be committed to large fixed interest payments.

(iv)   Management may wish to limit investment to a level that can be financed solely from retained earnings. They may not want to grow the company too quickly.

Hard capital rationing may arise for one of the following reasons.

(i)   Raising money through the stock market may not be possible if share prices are depressed.

(ii)   There may be restrictions on bank lending due to government control.

(iii)   Lending institutions may consider an organisation to be too risky (eg, too highly geared, poor prospects) to be granted further loan facilities.

(iv)   The costs associated with making small issues of capital may be too great.

Examiner's comments. Part (d) asked for an explanation, with examples, of 'relevant cost' in the context of investment appraisal. Weaker answers showed a lack of understanding of cost classification.

(d)   When appraising an investment project, it is essential that only those cash flows relevant to the project be taken into account, otherwise an incorrect investment decision could be made. A 'relevant cash flow' is an incremental cash flow that arises or changes as a direct result of the investment being made.

Some costs will be sunk before an investment decision is made. An example would be research and development or market research costs into the viability of a new product. Once incurred, such costs become irrelevant to the decision as to whether or not to proceed, and so should be excluded from the analysis.

Cash flows that would be relevant include an increase in production overheads or labour costs, new purchases that are necessary, and any incremental tax effects.

It is important to note that any interest payments on the finance for a new project are relevant to the project decision, but are not taken into account in any NPV calculation. The interest payments will already be 'built in' to the calculation in the discount factor that is being applied.

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Text references. Sources of finance are covered in Chapter 12.

Top tips. This question needs to be answered in sequence. Take each part in turn and remember some earlier analysis may be useful in later parts of the question, for instance in parts (c) to (e).

Easy marks. In part (a), the calculation of the theoretical ex-rights price per share. Make sure you are confident in calculating this.

In part (c) calculation of current EPS and earnings.

Examiner's comments. In part (a), almost all candidates calculated correctly the theoretical ex-rights price per share, but some calculated the value of rights per new share rather than per existing share. Some candidates disregarded the instruction to ignore issue costs. Answers to part (b) indicated that many candidates are unclear about the effect of a rights issue on shareholder wealth. Candidates could have calculated the current EPS in part (c) by dividing the share price by the PE ratio, but a significant number divided reserves by the number of shares. In part (d), the share price following redemption of some of the loan notes was found by multiplying the revised earnings per share by the constant price/earnings ratio. Most answers to part (e) did not include an evaluation of the effect of the rights issue on the debt/equity ratio and interest cover, even though this was required by the question. A comparison with sector averages was also required in order to gain full marks.

Marking scheme

			Marks
(a)	Theoretical ex rights price per share	2	
	Values of rights per existing share	1	
			3
(b)	Effect on wealth of exercising rights	2	
	Effect on wealth of sale of rights	2	
	Discussion of rights issues and shareholder wealth	2	
			6
(c)	Current earnings per share	1	
	Current earnings	1	
	Funds raised via rights issue	1	
	Interest saved by redeeming loan notes	1	
	Revised earnings	1	
	Revised earnings per share	1	
			6
(d)	Expected share price after redeeming loan notes	1	
	Comparison with theoretical ex rights price	1	
	Discussion and conclusion	1	
			3
(e)	Effect of rights issue on debt/equity ratio	2	
	Effect of rights issue on interest cover	2	
	Discussion and link to Tirwen Co	3	
			7
			25

(a)　(i)　Issue price of new shares = 85% × $4.00 = $3.40. The theoretical ex-rights price = ((5 × $4.00) + $3.40)/6 = $3.90.

　　　(ii)　The value of rights per existing share = ($3.90 − $3.40)/5 = 10c

(b)　Choices open to the investor are to either **refuse the offer**, **take up the offered rights** or **sell the rights** (or a combination).

　　If the investor does not subscribe to the offer, a loss of $100 will occur, being the difference between the value of 1,000 shares before the rights issue ($4,000) and the value of 1,000 shares after the rights issue ($3,900).

　　If the investor takes up the offered rights, he will purchase an additional 200 shares at $3.40 = $680. This will give the investor 1,200 shares at $3.90 each = $4,680. This is equal to the sum of the value of 1,000 shares before the rights issue ($4,000) plus the cash subscribed. As a result there is no overall change in wealth. Some cash has merely been transferred into shares.

　　If the rights are sold (1,000 rights at 10c each) then again there is no overall change in wealth. The $100 proceeds plus the value of the shares after the rights issue (1,000 shares at $3.90 each = $3,900) is the same as the value of the holding before the rights issue. Part of the wealth has been converted from shares into cash.

(c)　Current EPS = share price ∕ PE ratio = $4.00 ∕ 15.24 = 26.25c

　　Number of shares = $2,000,000 ∕ 50c = 4 million

　　Earnings = number of shares × EPS = 4m × 0.2625 = $1,050,000

　　Funds raised from rights issue = 4m ∕ 5 = 800,000 × $3.40 = $2,720,000

　　Net of issue costs = $2,500,000.

　　If this is entirely used to redeem loan notes, this will save $2,500,000 @ 12% = $300,000

	$	
Earnings before tax	1,500,000	$1.05 m grossed up for 30% tax rate
Debenture interest	540,000	$4.5m @ 12%
Overdraft interest	87,500	$1.25m @ 7%
Current PBIT	2,127,500	
Revised interest cost	(327,500)	$540k + $87.5k − $300k
	1,800,000	
Tax at 30%	(540,000)	
Revised profit after tax	1,260,000	
Total new shares	4,800,000	
Revised EPS	26.25	

(d)　As it is stated that the PE ratio will remain constant, and EPS has not changed, this means that the share price will remain unchanged at EPS × PE = 26.25c × 15.24 = $4.00. As the theoretical ex rights price is $3.90 for each share, this results in a gain of 10c per share.

(e)　**Debt equity ratio** (using debenture debt only)

　　Current: 4,500 ∕ 3,500　　　　　　　　129%

　　This is above the sector average. If $2.5m of debenture debt is redeemed:

　　2,000 ∕ 6,000　　　　　　　　　　33%

　　If the debt is not reduced:

　　4,500 ∕ 6,000　　　　　　　　　　75%

　　These are both less than the sector average, and will indicate reduced financial risk.

Interest cover

Current: 2,127,500 ⁄ 627,500   3.4

If $2.5m of debenture debt is redeemed:

2,127,500 ⁄ 327,500   6.5

Thus interest cover improves to above the sector average.

A rights issue is therefore an attractive source of finance for Tirwen, although it must be noted that equity finance is relatively more expensive than debt finance and will affect the company's cost of capital when assessing projects in the future.

A rights issue will decrease gearing and improve interest cover if the funds are used to redeem some of the debenture debt. The reduction in debt on the balance sheet will make it more likely that Tirwen can raise additional finance in the future, perhaps at a cheaper rate.

34 PG

> **Text references.** Sources of finance are covered in Chapter 12.
>
> **Top tips.** Be warned if you got (a) (i) wrong that manipulation of the earnings and price formulae may come up in this paper. (a)(ii) brings out the limitations of the theoretical ex rights price calculation. Actual price movements depend on the state of the market, the degree of market efficiency and, very importantly, the risk profile.
>
> In (b) (ii) you are only asked about the advantages of issuing convertible loan notes; the principal feature is short-term benefits from being able to raise funds at limited cost, with possible adverse consequences (dilution of earnings, change in control) only happening long-term.
>
> The dividend valuation model is at the heart of the answer to (b) (iii). You may not have covered this yet so read through the answer provided.

(a)   (i)   The **current market price** can be found by multiplying the earnings per share (EPS) by the price/earnings (P/E) ratio.

EPS is $3.6/6m = 60c per share

P/E ratio is 15

Market price of shares is 15 × 60c = **$9.00 per share**

(ii)   In order to raise $10,500,000 at a price of 800 cents, the company will need to issue an additional 1,312,500 ($10,500,000/$8.00) shares.

Following the investment, the total number of shares in issue will be 7,312,500 (6,000,000 + 1,312,500).

At this point, the total value of the company will be:

(6m × $9) + $10,500,000 = $64,500,000

The **theoretical ex-rights price** will therefore be $64.5m/7.3125m = **$8.82**.

Problems with calculations

(1)   The **costs of arranging the issue** have not been included in the calculations.

(2)   The **market view** of the **quality of the new investment** will affect the actual price of the company's shares.

(3)   If the **issue** is **not fully subscribed** and a significant number of shares remain with the underwriters, this will **depress the share price**.

(4)   The effect of the new investment on the **risk profile** of the company and the expected **future dividend stream** could also cause the share price to differ from that predicted.

(5)   The price of the shares depends not only on the financial performance of the company, but also on the **overall level of demand** in the stock market. If the market moves significantly following the announcement of the issue, this will affect the actual price at which the shares are traded.

(iii)   **Features of deep discounted rights issue**

In a **deep-discounted** rights issue, the new shares are priced at a **large discount** to the current market price of the shares. The purpose of this is to ensure that the issue is well subscribed and that shares are not left with the underwriters, and thus this form of issue pricing is attractive when the inventory market is particularly volatile. However, the shares cannot be issued at a price which is below their nominal value.

Disadvantage of deep discounted rights issue

The main drawback to this approach is that a **larger number of shares** will need to be **issued** in order to raise the required amount of finance, and this will lead to a larger dilution of earnings per share and dividends per share.

(b)   (i)   **Conversion premium**

The **conversion premium** is the **difference** between the **issue value** of the **notes** and the **conversion value** as at the date of issue. In other words it is the measure of the additional expense involved in buying shares via the convertible loan notes as compared with buying the shares on the open market immediately.

In this case, $100 loan notes can be converted into 11 ordinary shares. The **effective price** of these shares is therefore $9.09 per share.

The **current market price** of the shares is $9.00. The **conversion premium** is therefore $9.00 – $9.00 = **9 cents**. This can also be expressed in percentage terms as **1%** (0.09/9).

(ii)   **Advantages of issuing convertible loan notes**

(1)   **Convertibles** should be **cheaper than equity** because they offer greater security to the investor. This may make them particularly attractive in fast growing but high-risk companies.

(2)   **Issue costs** are **lower** for loan notes than for equity.

(3)   **Interest** on the **loan notes** is **tax deductible**, unlike dividends on ordinary shares.

(4)   There is **no immediate change** in the **existing structure** of control, although this will change over time as conversion rights are exercised.

(5)   There is no **immediate dilution** in **earnings** and **dividends per share**.

(iii)   **Dividend policy**

Dividend policy is one of the major factors which determines the share price. Under the **dividend valuation model**, the share price is held to be directly related both to the current dividend and to the expected future growth in dividends:

$$P_0 = \frac{D_0(1+g)}{(r-g)}$$

where: P_0 =   market price of shares
    D_0 =   current level of dividend
    r   =   required rate of return
    g   =   expected annual growth in dividend

Impact of dividend growth

Thus it can be seen that dividend growth is important in determining the likely market value of the shares. As has already been discussed above, the market value of the shares is very important in determining the price of convertibles, and therefore the dividend policy of the company will have an important effect on the value of convertible loan notes.

35 Newsam Co

(a) **Capital gearing**

Capital gearing is concerned with a company's **long-term capital structure**. The covenants attaching to the debenture do not define clearly what they mean by capital gearing in this context, in particular whether the bank overdraft should be included as long-term debt capital. However, since it appears that the overdraft has been used principally to finance non-current assets in the form of machinery rather than as a source of working capital, it is probably reasonable to argue that it should be included as part of the prior charge capital. The gearing ratio can thus be defined as:

$$\frac{\text{Prior charge capital}}{\text{Shareholders' funds}} = \frac{\text{Debentures} + \text{overdraft}}{\text{Ordinary shares} + \text{reserves}}$$

The gearing ratios can now be calculated.

(i) **Book values**: $\dfrac{\$5.0m + \$3.0m}{\$5.0 + \$10.0m} = 53.3\%$

(ii) **Market values**

Market value of loan notes:

$\$5.0m \times 115\%$	$= \$5.75m$
Market price of shares	$= \text{P/E ratio} \times \text{Earnings per share}$
	$= \text{P/E} \times \dfrac{\text{Profit after tax}}{\text{Number of shares}}$
	$= 14 \times \$1.34m/20m = 93.8c$
Market value of equity	$= \text{Market price} \times \text{number of shares}$
	$= 93.8c \times 20m = \$18.76m$
Gearing ratio	$= \dfrac{\$5.75m + \$3.0m}{\$18.76m} = 46.6\%$

(b) **Terms of covenant**

It appears from the calculations above that if calculated on the basis of **book values**, Newsam has already breached the covenant relating to the gearing level. If the gearing is calculated using **market values**, then Newsam has not yet breached this covenant, but with a gearing of 46.6% is very close to doing so. If short-term payables were included, the gearing measures would be increased.

The required liquidity range for the current ratio is 1.08 (1.35 × 80%) to 1.62 (1.35 × 120%). Newsam's current ratio (current assets: current liabilities) is 1.0 ($7.0m:$7.0m). The company is therefore in breach of the covenant with respect to liquidity.

(c)   **Dangers of high gearing**

A **high gearing level** only constitutes a danger when the level and volatility of earnings is such that the company is at risk of being unable to meet the interest payments as they fall due. If this situation arises the company could be forced to **liquidate assets** to meet the demands of its payables, and this in turn could jeopardise its operating viability. It follows that the absolute level of gearing cannot be used to assess the financial risk faced by the company. It is more helpful to assess the level of interest cover in the light of the degree of volatility in earnings.

Interest coverage

Interest coverage can be calculated as the rate of operating profit: interest payable. In Newsam's case, the cover is currently 3.0 times ($3.0m:$1.0m). There is little evidence available on which to assess earnings stability, but the fact that sales growth has been steady rather than spectacular may be taken to imply that earnings are not especially volatile. If this is the case then the existing level of gearing does not appear to be dangerous.

Quality of asset backing

A further factor to take into account is the **quality of the asset backing** since this will influence the attitude of its lenders if Newsam faces problems in repaying its debt. Land and buildings currently appear in the accounts at $9.0m, and it is of crucial importance to know how this relates to **current market valuations**. If this figure is conservative then the payables' security could be fairly good. Land and buildings at $9m represent 75% of the value of total payables (including trade payables). It is unlikely that anything close to the book valuation of plant and machinery and inventory could be realised in the event of a forced sale; however, it is to be hoped that the major part of the receivables figures is collectable. Thus, in summary, the company appears to have adequate asset backing in the event of a forced restructuring or liquidation.

Conclusion

The factors discussed above, when taken together, suggest that the **level of gearing** is not particularly dangerous. However, if the company is actually in breach of its debenture covenants, the courses of action available to the debenture holders and their attitude towards the situation will be of key importance in determining the true dangers of the company's position.

(d)   (i)   **Operating leases**

If the company is to **lower its capital gearing** it needs either to **increase** the value of its **issued share capital** and reserves or to **decrease the size of its borrowings**. Since growth is low and cash resources relatively small it seems unlikely the company will be able to repay much of the debt in the short-term future from operational funds. However, one option might be to **convert** some of the owned plant and vehicles onto **operating leases** and thus reduce the size of the bank overdraft.

Sale and leaseback

Similarly the company might be able to raise funds through a **sale and leaseback** of property which could be used to reduce the level of debt. There may also be some scope to reduce the level of working capital through improving inventory and receivable turnovers and increasing the amount of credit taken from suppliers. However, the opportunities are likely to be limited: for example, the average debt collection period could probably not be reduced much below the current level of 52 days.

Increasing shareholders' funds

Policies that could be used to increase the size of shareholders' funds include the following.

(1)   **Non-current asset revaluation**

It is implied that land and buildings have not been revalued since their acquisition twelve years ago. Despite a slump in the property market it is possible that land and buildings may be

undervalued, and a revaluation could result in a **strengthening of reserves** and hence an improvement in the capital gearing.

    (2)   **Rights issue**

The reaction of the market to a rights issue will depend on the **rating** of the company and the **purpose** for which the issue is being made. In this case, growth has been slow, the P/E ratio is low in relation to the sector average implying a low rating, and the purpose of the issue is not to finance new growth opportunities but to reduce the level of debt. Given a relatively flat market, investors are unlikely to view such an issue positively. As a result the issue would need to be **priced** at a **relatively large discount** to make it attractive; this in turn would increase the earnings dilution and impact badly upon the share price.

    (3)   **Placing**

The company may find it easier to make a placing with the institutions. However, it might need to gain the agreement of the shareholders to forgo their pre-emptive rights in this situation.

    (4)   **Brand capitalisation**

The appearance of the balance sheet could be improved by this method, but investors and payables may not place much weight on such a valuation.

(ii)   **Reduction in interest charges**

In order to improve the level of interest coverage, Newsam will need to **reduce the level of its interest charges**. Options available include the following.

    (1)   **Redeem the loan notes and replace with additional overdraft**

This would reduce the interest cost as follows.

$5m × (15% − 9%) = $0.3m

The interest coverage would then become:

$3m ÷ ($1.0m − $0.3m) = 4.3 times

    (2)   **Redeem the loan notes and replace with Eurodollar bond**

This would reduce the interest cost:

$5m × (15% − 5%) = $0.5m

The interest coverage would become:

$3m ÷ ($1.0m − $0.5m) = 6 times

The improvement in interest coverage makes this appear an attractive option. However if the dollar continues to strengthen in the manner suggested by the forward rates, at 4% per annum, this would effectively wipe out the benefit by the end of the first year.

    (3)   **Redeem the loan notes and replace medium to long-term debt**

A medium term bank loan would be a possibility.

Although probably more expensive than the overdraft or eurodollar bond, this would be free from the risk of foreign currency movements and would offer more security than the use of short-term finance which is repayable on demand.

Conclusion

It is therefore suggested that, unless Newsam has significant dollar incomes, it should investigate the possibility of a medium-term sterling loan.

(e)   **Convertibles**

Companies normally issue convertibles in the expectation that the **holders will exercise their options**. Convertibles can therefore be seen as a form of **delayed equity**. They are attractive to the firm when the

price of the ordinary shares is **abnormally low** at the date of issue, and at times when to issue a further tranche of equity would result in a significant drop in earnings per share. However they also carry the risk that the **share price will not rise** in line with expectations at the time of issue and that holders will not therefore convert. If the loan notes are dated, then the company must have funds in place to **allow redemption** on the due date. Convertibles also have a short term benefit in that interest payments are allowable against tax.

Consequences of issuing convertibles

Convertibles therefore may form part of the strategy of a company whose objective is to raise new equity, but which for various reasons does not wish to go directly to the market in the short term. They are often preferable to straight loan notes since they **do not commit the company indefinitely** to the payment of large interest bills. They further allow the company to **widen the investment base** by attracting investors looking for a guaranteed short term income plus the possibility of a capital gain at a later date. They have also recently formed a part of the strategy of companies that wished to **manipulate their reported gearing** and earnings per share, since they could choose whether to show them as equity or debt. However, this loophole has now been closed.

36 Arwin

Text references. Gearing and the capital structure decision is covered in Chapter 14.

Top tips. This question expected you to prepare a forecast income statement which would then be used in part (b) to calculate various ratios. Provided you know your ratios, parts (a) and (b) should be comfortably answered and a passmark attained already. Part (c) needs a formal discussion of the two types of risk. So define them and explain them in the context of the types of gearing already calculated.

Easy marks. The requirements of part (a) involved simple calculations.

Examiner's comments. This was a popular question, but many candidates experienced difficulty in producing forecast income statements for both of the financing proposals. Candidates must have a good understanding of sources of finance to be successful. The most common error was to omit fixed costs. Many markers commented that the standard of answers to part (b) was poor, with some candidates showing that they did not know how to calculate common ratios. Some even attempted to answer this part of the question without calculating any ratios at all. It is impossible to make reasoned comments in the absence of analysis. For example, the claim that earnings per share will decrease if more shares are issued will not be true if earnings have increased due to the investment of the funds raised. Most answers to part (c) were of an acceptable standard, although candidates often failed to frame their answers according to the wording of the question.

Marking scheme

			Marks
(a)	Sales and administration cost	1	
	Cost of sales	1	
	Interest	1	
	Profit after tax	1	
	Retained earnings	1	
			5
(b)	Revised share capital and reserves	1	
	Financial gearing	2	
	Operational gearing	2	
	Interest cover	2	
	Earnings per share	2	
	Calculation of current values	1	
	Discussion	2	
			12

(c)	Explanation of business risk		1
	Explanation of financial risk		1
	Up to 2 marks for each danger of high gearing		6
			8
			25

(a)

	Debt finance	Equity finance	
	$'000	$'000	
Sales	56,000	56,000	50,000 × 1.12
Variable cost of sales	(28,560)	(28,560)	30,000 × 85% × 1.12
Fixed cost of sales	(4,500)	(4,500)	
Gross profit	22,940	22,940	
Administration costs	(14,700)	(14,700)	14,000 × 1.05
PBIT	8,240	8,240	
Interest	(800)	(300)	Debt finance cost 10% × $5m = $500k
			in addition to existing $300k
Profit before tax	7,440	7,940	
Tax at 30%	(2,232)	(2,382)	
Profit after tax	5,208	5,558	
Dividends at 60%	(3,125)	(3,335)	
Retained earnings	2,083	2,223	

(b)

Financial gearing	Current	Debt finance	Equity finance
Debt/equity ratio:			
Debt	2,500	7,500	2,500
Share capital and reserves	22,560	24,643	29,783
Debt/equity ratio %	11.1%	30.4%	8.4%
Operational gearing	Current	Debt finance	Equity finance
Contribution/PBIT			
Contribution	24,500	27,440	27,440
PBIT	6,000	8,240	8,240
Operational gearing	4.1	3.3	3.3
Interest coverage	Current	Debt finance	Equity finance
PBIT	6,000	8,240	8,240
Debt interest	300	800	300
Interest coverage	20	10.3	27.5
Earnings per share	Current	Debt finance	Equity finance
Profit after tax	3,990	5,208	5,558
Number of shares	10,000	10,000	11,250
EPS	39.9	52.1	49.4

The **debt finance proposal** increases EPS by the largest amount, but will reduce interest coverage and increase financial gearing. Whether these changes are acceptable depends both upon sector averages and the response of investors and managers. A decision to use equity finance would decrease financial gearing but would increase interest coverage. EPS would increase too. A decrease in operational gearing would result from both proposals.

(c) (i) **Business risk**, the inherent risk of doing business for a company, refers to the risk of making only low profits, or even losses, due to the nature of the business that the company is involved in. One way of measuring business risk is by calculating a company's operating gearing or 'operational gearing'.

$$\text{Operating gearing} = \frac{\text{Contribution}}{\text{Profit before interest and tax (PBIT)}}$$

The significance of operating gearing is as follows.

(1) **If contribution is high but PBIT is low**, fixed costs will be high, and only just covered by contribution. Business risk, as measured by operating gearing, will be high.

(2) **If contribution is not much bigger than PBIT**, fixed costs will be low, and fairly easily covered. Business risk, as measured by operating gearing, will be low.

(ii) A high level of debt creates financial risk. This is the risk of a company not being able to meet other obligations as a result of the need to make interest payments. The proportion of debt finance carried by a company is therefore as significant as the level business risk. . Financial risk can be seen from different points of view.

(1) **The company** as a whole. If a company builds up debts that it cannot pay when they fall due, it will be forced into liquidation.

(2) **Payables**. If a company cannot pay its debts, the company will go into liquidation owing payables money that they are unlikely to recover in full.

(3) **Ordinary shareholders**. A company will not make any distributable profits unless it is able to earn enough profit before interest and tax to pay all its interest charges, and then tax. The lower the profits or the higher the interest-bearing debts, the less there will be, if there is anything at all, for shareholders.

37 Food retailers

Text references. Sources of finance are covered in Chapter 12 and shareholder ratios in Chapter 1.

Top tips. In (a), as well as commenting on the P/E ratios given in the table, you could also calculate high and low P/E ratios for the year and use this information to illustrate the meaning of the ratio to investors.

In (b), it is possible to calculate the level of dividends using the share price information and the dividend yield, and then to calculate earnings using the share price information and the P/E ratio. These figures can then be used to calculate the dividend cover. However, it is quicker to take the inverse of the product of the two ratios, and this is the method illustrated in the suggested solution.

(c) is a good illustration of the importance of being able to predict market sentiment, as there are various different standpoints the market could take.

(a) **Price-earnings ratio**

The **price earnings (P/E) ratio** is regarded by many as the most important yardstick for assessing the relative worth of a share. It is calculated as:

$$\frac{\text{Market price of share}}{\text{EPS}}$$

This can also be expressed as:

$$\frac{\text{Total market value of equity}}{\text{Total earnings}}$$

The P/E ratio is a measure of the **relationship** between the **market value** of a company's shares and the **earnings** from those shares. It is an important ratio because it relates **two key variables** for investors, the market price of a share and its earnings capacity.

Stock market appraisal

The value of the P/E ratio reflects the **market's appraisal** of the share's future prospects. In other words, if one company has a higher P/E ratio than another it is because investors either expect its earnings to increase faster than the other's, or they consider that it is a less risky company or in a more secure industry.

Influence of market efficiency

The level of the ratio will change directly in response to changes in the share price and may vary widely during the course of the year as **events alter investor perceptions**. The extent and timing of changes will depend on the **efficiency** of the market; the stronger the level of efficiency, the more the market will be able to anticipate events.

Comparisons

Earnings potential is strongly related to the sector in which the business operates, and therefore P/E **comparisons** are only valid in respect of **companies in the same market** sectors. They can be used in this case since all the companies are publicly quoted food retailers.

Price earnings ratios of companies being compared

Using the information given in the table, the P/E ratio for Axis is 13.0. This means that it would take thirteen years for the earnings from the share to equal the price paid for it. The ratio for Spin is 21.1, the higher ratio meaning that the time taken for the earnings to **equal** the price of the share is 21.1 years. The reason for the higher level is that investors expect **earnings** from Spin to rise at a **faster rate** than those from Axis. The P/E ratio gives no indication of itself as to *why* earnings are expected to increase at different rates, although possibilities include superior management quality or more aggressive investment plans.

Ply has a current share price of 63 cents and a P/E ratio of 14.2. Earnings for last year were therefore 4.437 cents per share (63/14.2). At its high point for the year when the share price was 112, the P/E ratio was 25.2, while at its low point, the P/E ratio was 12.2. The figures also demonstrate that Spin has the **lowest level of volatility**, Axis the **highest**. This appears to reinforce the point made above that investors are confident about Spin's prospects (hence the P/E ratio has not altered much over the year), but are rather less sure about Axis's future.

(b) **Dividend cover**

The dividend cover is the number of times that the actual dividend could be paid out of current profits. It indicates the **proportion** of **distributable profits** for the year that is being **retained** by the company and the level of risk that the company will not be able to maintain the same dividend payments in future years, should earnings fall.

Calculation of dividend cover

In this case, the ratio must be approached by means of the dividend yield and the P/E ratio:

$$P/E = \frac{\text{Market share price}}{\text{Earnings}} \qquad \text{Div yield} = \frac{\text{Dividend paid}}{\text{Market share price}}$$

$$P/E \times \text{Div yield} = \frac{\text{Dividend paid}}{\text{Earnings}} \text{ (since the Market share price cancels out)}$$

This is the inverse of the dividend cover, and therefore:

Dividend cover = 1 ÷ (P/E × div yield)

	P/E	Div yield	P/E × div yield	Dividend cover
Spin	21.1	2.3%	0.4853	2.06 times
Axis	13.0	2.1%	0.2730	3.66 times

Comparisons

As with the P/E ratio, comparisons with other companies in the same sector are a lot more valuable than comparisons with companies in different sectors, as the 'typical rate' for different business sectors will vary widely.

Dividend covers of companies being compared

The lower level of dividend cover for Spin means that the company has paid out nearly **half** of its **earnings** in the form of dividends, while Axis has only paid out less than one third. This suggests that Axis has **retained a higher proportion of profits** for **reinvestment** within the business. If earnings are very volatile, the figures could suggest that Spin might have **problems** in continuing to **pay out dividends** at this level in the future. However as indicated above, the market appears confident about Spin's future, and rates Axis rather lower despite Axis retaining more funds for future expansion.

(c) **Payment of dividends from reserves**

If a company pays dividends in excess of earnings, then this payment must be made out of **reserves**. The effect of this will be to **reduce the net asset value** of the business.

Reasons for payment from reserves

(i) The company believes that it must continue to pay a **high level of dividends** in order to **support the share price**. If profits for the year are too low to support the previous level of dividends, the directors may decide that it should make a payment out of reserves rather than reduce the level of dividends.

(ii) If a company has a **high level of reserves** for which it **cannot find** an attractive **investment opportunity**, it may decide that it is appropriate to repay part of those reserves to investors by means of a dividend payment.

Problems with payment from reserves

(i) The fall in the net asset value of the business may make it **more vulnerable** to a **takeover** bid.

(ii) The market may see the payment out of reserves as a **desperate measure** on the part of the directors, and this may trigger a **significant drop in the share price**.

(iii) Payment of dividends that are in excess of earnings could lead to a **shortage of cash** for the business.

(d) **Reasons for using loan notes**

(i) **Loan notes** are a **cheaper form of finance** than preference shares because debenture interest is tax deductible, unlike preference dividends.

(ii) **Loan stock** are **more attractive** to **investors** because they are secured against the company's assets.

(iii) **Debenture holders rank before preference shareholders** in the event of a liquidation.

(iv) **Issue costs** should be **lower for loan notes** than for preference shares.

38 CF Co

Text references. Cash budgets are explained in Chapter 6, sources of finance for SMEs are covered in Chapter 14 and venture capital in Chapter 12.

Top tips. Sources of finance discussion questions are very likely to be combined with cash flow or working capital calculations.

As with all cash budget questions, you should start your answer to (a) by setting up the proforma and slotting the easy figures such as non-current assets, rent and wages in, before going on to calculate sales and purchases. You should set out your workings for calculating the monthly sales clearly so as to avoid careless errors.

Make sure your answers in part (b) relate specifically to small businesses and are not a general description of sources of finance.

The common thread in (c) is that venture capital is often provided for a major business development in the medium to long-term, and would not normally be provided to sort out short-term day-to-day problems.

(a) **Cash budget for the period January 20X2 to May 20X2**

	January $	February $	March $	April $	May $
Receipts					
Share capital	200,000				
Sales (W1)		9,360	28,440	40,320	66,240
Total receipts	200,000	9,360	28,440	40,320	66,240
Payments					
Non-current assets	250,000				
Material purchases (W2)	16,800	25,200	33,600	67,200	67,200
Wages	4,000	4,000	4,000	4,000	4,000
Overheads	3,000	6,000	6,000	6,000	6,000
Rent	6,000			6,000	
Total payments	279,800	35,200	43,600	83,200	77,200
Net cash flow	(79,800)	(25,840)	(15,160)	(42,880)	(10,960)
Opening cash balance	0	(79,800)	(105,640)	(120,800)	(163,680)
Closing cash balance	(79,800)	(105,640)	(120,800)	(163,680)	(174,640)

Workings

1   *Sales receipts*

	January	February	March	April	May
Units sold	2,400	3,600	4,800	9,600	9,600
Turnover ($10/unit)	24,000	36,000	48,000	96,000	96,000
Rec'd after 1 mth (before discount)		9,600	14,400	19,200	38,400
Rec'd after 1 mth (net of discount)		9,360	14,040	18,720	37,440
Rec'd after 2 mths			14,400	21,600	28,800
Total sales receipts		9,360	28,440	40,320	66,240

2   *Material purchases payments*

	January	February	March	April	May
Units sold	2,400	3,600	4,800	9,600	9,600
Purchases $7/unit	16,800	25,200	33,600	67,200	67,200

(b) The cash budget for the first five months of trading by CF Co shows that the company will need additional financing throughout this period. The cash flow problem in this case has two components:

(1)   There is a **large non-current asset investment** required in the first month of operation, the size of which exceeds the initial capital injection.

(2)   Sales are **not forecast** to **reach a steady state** until April, and receipts from customers lag the sales.

Normal pattern

Once sales have stabilised, the typical **monthly cash flow** will be as follows:

	$	$
Sales: 9,600 units × $10 × 60%	57,600	
9,600 units × $10 × 40% × 97.5%	37,440	
Total receipts		95,040
Purchases: 9,600 units × $7	67,200	
Wages	4,000	
Overhead	6,000	
Rent (monthly charge)	2,000	
Total payments		79,200
Net monthly cash flow		15,840

The cash deficit at the end of May is forecast to be $174,640. It will therefore take **just over eleven months** for the **deficit to be eliminated, assuming that cash flows are in** line with forecasts.

CF will need to consider obtaining an **overdraft** from the bank and must also consider the need for **longer term funds** (loans or equity funds) to finance the permanent element of working capital and non-current assets.

(c) **Matching of funding**

A general principle of financing is that the funding term should match the asset life. Therefore, non-current assets should normally be financed using **long-term sources of funds**.

Possible finance sources

There is a wide variation in the size and type of non-current assets, from photocopiers to new buildings, and therefore the relative amount of funds required, and the most appropriate form of funding will vary. However, the following sources of finance could be considered by a small business.

(i) **Retained earnings**

Relatively small asset purchases, such as a new computer, can often be financed using cash arising from retentions, and thus no additional external funds will be required.

(ii) **Leasing and hire purchase**

These can also be considered for **smaller assets**. They can be used to spread the cost of the asset over its **useful life**. The main types of agreement available are:

- **Operating leases**. These are generally for a period less than the economic life of the asset. The risks and rewards of ownership remain with the lessor. However, in areas where there is a fast rate of technological change, such as computers, they have the advantage of giving flexibility to the lessee.

- **Finance leases**. These generally cover the whole economic life of the asset, and the risks and rewards of ownership are transferred to the lessee.

- **Hire purchase**. This is a form of instalment credit, whereby the ownership of the goods passes to the customer on payment of the final credit instalment.

(iii) **Secured loan**

Depending on the nature of the asset, it may be possible to obtain a **secured bank** loan (either medium or long-term) against the asset being purchased. The **Loan Guarantee Scheme** is an example of a government initiative to help small businesses. It is intended to help small businesses to get a loan from the bank, when a bank would otherwise be unwilling to lend because the business cannot offer the security that the bank would want.

Under the scheme, the bank can lend up to a certain limit without security over **personal** assets or a personal guarantee being required of the borrower. However, all available **business** assets must be used as security if required. The government will guarantee for example, 75% of the loan, while the borrower must pay an annual percentage premium on the guaranteed part of the loan.

(iv) **Mortgage**

This may be appropriate if the assets being acquired are **land or buildings**.

(v) **Grants**

A grant is a sum of money given to an individual or business for a specific project or purpose. A grant usually covers only part of the total costs involved.

Grants to help with **business development** are available from a variety of sources, such as the government, European Union, Regional Development Agencies, local authorities and some charitable organisations.

These grants may be linked to business activity or a specific industry sector. Some grants are linked to specific geographical areas, eg those in need of economic regeneration.

(vi) **Venture capital**

This form of finance may be appropriate for larger investments related to expansion or new product development. Venture capital is essentially **risk capital**, and has the advantage that new equity funds are provided, generally for a restricted time period at the end of which the investor will seek an exit from the business. The benefit of this is that in the longer term the ownership structure of the business is unchanged.

(vii) **Other sources of equity**

These include further investments from the existing shareholders, the use of a **'business angel'**, or possibly some form of Alternative Investment Market (AIM) flotation. The AIM route is only likely to be appropriate for significant long-term expansions.

If the company does not go down the AIM route, it may have difficulty in obtaining equity finance, because of its liquidity problems or because shareholders will find it difficult to sell their shares.

Enterprise capital funds (ECFs) were launched in the UK in 2005. ECFs are designed to be commercial funds, investing a combination of private and public money in small high-growth businesses. They are based on a variant of the Small Business Investment Company (SBIC) programme that has operated in the United States for the past 45 years. The SBIC programme has supported the early growth of companies such as FedEx, Apple, Intel and AOL.

For investment below £500,000 most SMEs can access an informal funding network of their friends, families and business angels. Once companies require funding above £2m they are usually quite established, generating revenues and therefore perceived as lower risk and are able to secure funding from institutional investors. The gap between these two finance situations is known as the 'equity gap'.

ECFs provide Government match funding for business angels and venture capitalists to help small and medium sized businesses bridge the equity gap. Each ECF will be able to make equity investments of up to £2 million into eligible SMEs that have genuine growth potential but whose funding needs currently are not met.

(d) **Expansion**

A private company might want to invest **more capital** in an **expansion** programme, but be unable to raise the funds internally or from a bank loan. It might therefore seek venture capital.

Management buy-out

A business might need capital for a **management buyout**. The management team buying out the business is unlikely to have enough capital of its own to buy the entire business.

Research and development

A business might want capital to invest in **research and development**, which would be regarded as a high-risk venture. Other sources of finance might therefore be unavailable.

Low share price

A public company might need **extra equity finance** but be unable to issue more shares because its share price is currently below par. (Companies are forbidden by law to issue shares at below their nominal value.)

Start-ups

Venture capital is sometimes available for **company start-ups**.

39 TFR Co

Marking scheme

			Marks
(a)	Forecast income statements	2	
	Interest cover	2	
	Debt/equity ratio	2	
	Return on equity	2	
	Return on capital employed	2	
			10
(b)	Cash flow implications	3	
	Dividend implications	2	
	Other relevant discussion, including ratios	3-5	
		Maximum	8
(c)	Discussion of difficulties faced by small companies		7
			25

(a) **Income statements for TFR Co for the four-year period**

Year	Current	Year 1	Year 2	Year 3	Year 4
	$	$	$	$	$
Turnover	210,000	255,000	300,000	345,000	390,000
Expenses (80%)	168,000	204,000	240,000	276,000	312,000
Net profit (20%)	42,000	51,000	60,000	69,000	78,000
Interest (W)	2,000	11,000	8,750	6,500	4,250
Profit before tax	40,000	40,000	51,250	62,500	73,750
Tax (25%)	10,000	10,000	12,812	15,625	18,438
Profit after tax	30,000	30,000	38,438	46,875	55,313
Dividend (50%)	15,000	15,000	19,219	23,438	27,656
Retained profit	15,000	15,000	19,219	23,438	27,656
Equity finance	200,000	215,000	234,219	257,657	285,313
Debt finance	nil	75,000	50,000	25,000	nil
Interest cover (times)	21·0	4·6	6·9	10·6	18·4
Debt/equity (%)	nil	35	21	10	nil
Return on equity (%)	15	14	16	18	19
ROCE (%)	21	18	21	24	27
ROCE (%)*	19	16	20	23	26

*Including the existing and continuing overdraft in capital employed

Working

Annual interest (assuming the continuing overdraft is maintained at the current level)

Year 1 interest payment = 100,000 × 0·09 = 9,000 + 2,000 = $11,000
Year 2 interest payment = 75,000 × 0·09 = 6,750 + 2,000 = $8,750
Year 3 interest payment = 50,000 × 0·09 = 4,500 + 2,000 = $6,500
Year 4 interest payment = 25,000 × 0·09 = 2,250 + 2,000 = $4,250

(b)   **Financial implications for TFR Co of accepting bank loan**

Meeting the annual loan payments

The main issue is whether TFR Co will be able to meet the annual payments of interest and capital. The cash flow forecast has assumed that there is no difference between profit and cash, and that inflation can be ignored. The annual cash surplus after meeting interest and tax payments is therefore assumed to be equal to retained profit.

Year	1	2	3	4
	$	$	$	$
Retained profit	15,000	19,219	23,438	27,656
Capital repayment	25,000	25,000	25,000	25,000
Net cash flow	(10,000)	(5,781)	(1,562)	2,656

These net cash flow figures show that TFR Co **will not be able to meet the annual capital repayments**. A possible solution would be to **change the current dividend policy** of paying a constant proportion of profit after tax as dividends. For example, TFR could cut its dividend now and then increase it in the future as profitability allows. As TFR Co is owner-managed, this change will depend on the extent to which the owner or owners rely on dividend income.

The figures below show the **amount of profit available** in each year before dividends are paid. The annual cash flow shortfall is less than the annual dividend payment, so such a change in dividend policy would probably allow the loan to be accepted.

Year	1	2	3	4
	$	$	$	$
Profit after tax	30,000	38,438	46,875	55,313
Capital repayment	25,000	25,000	25,000	25,000
Available funds	5,000	13,438	21,875	30,313

Year 5 key financial indicators

Assuming that no turnover growth occurs after the fourth year, the key financial information in Year 5 will be as follows.

	$
Turnover	390,000
Expenses	312,000
Net profit	78,000
Interest	2,000
Profit before tax	76,000
Tax	19,000
Profit after tax	57,000
Dividend	28,500
Retained profit	28,500
Equity finance	313,813
Debt finance	nil
Interest cover (times)	39
Debt/equity (%)	nil
Return on equity (%)	18
ROCE (%)	25
ROCE (%)*	23

*Including the existing and continuing overdraft in capital employed

Financial analysis

If the interest and capital payments are kept up, **financial risk** will be lower than its current level at the end of four years. After five years, **interest cover** has increased from its current level of 21 times to 39 times. However it fluctuates considerably during this period. It is quite low at 4·6 times at the end of the first year but at the end of the second year, it has improved to 6·9 times. There are further increases in subsequent years.

The **debt/equity ratio** peaks at 35% at the end of the first year and then falls rapidly with TFR Co returning to its current ungeared position after five years.

Both **return on equity (ROE)** **and return on capital employed (ROCE)** improve with growth in turnover, but are lower than current levels in the first and second years after the loan is taken out. At the end of five years ROE has improved to 18% from 15% and ROCE from 19% to 23%.

These figures indicate that TFR should be able to expand its business using debt finance, provided interest and capital repayments can be met. However, the **continuing overdraft** cannot be ignored when assessing financial risk. An average overdraft of $20,000 is quite large for a company with an annual turnover of $210,000. TFR Co may therefore consider asking for a **longer repayment period**, with lower annual capital repayments, if it plans to reduce the size of the overdraft or if it is concerned about future cash flow problems.

(c)   **Difficulties faced by small firms when seeking finance**

Debt finance

The main handicap that small companies such as TFR Co face in accessing funds is the problem of **uncertainty.** A small company may not have the **business** history **nor larger track record** that larger organisations possess. Larger enterprises are subject by law to **more public scrutiny**; their accounts have to contain more detail and be audited, they receive more press coverage and so on. Because of the uncertainties involved, banks often use **credit scoring** systems to **control exposure.**

Because the information is not available in other ways, small companies will have to provide it when they seek finance. They will need to give a business plan, list of the firm's assets, details of the experience of directors and managers and show how they intend to provide security for sums advanced.

A common problem is often that the banks will be **unwilling** to increase loan funding without an increase in **security** given (which the owners may be unwilling or unable to give), or an increase in equity funding (which may be difficult to obtain).

A further problem is the **maturity gap**. It is particularly difficult for small companies to obtain medium term loans due to a mismatching of the maturity of assets and liabilities. Longer term loans are easier to obtain than medium term loans as longer loans can be secured with mortgages against property.

In general, banks tend to ask for **personal guarantees** from owners and will set interest rates at **higher levels** than those charged to larger companies. TFR Co has non-current assets which are much greater in terms of value than the amount of its overdraft and so the company may be able to offer these as security for a loan.

Equity finance

Small firms such as TFR often face an **equity gap.** There are unlikely to be any wealthy individuals willing to invest in this company because there are likely to be more attractive investments elsewhere. A major problem with obtaining equity finance can be the inability of the small firm to offer an easy **exit route** for any investors who wish to sell their stake.

Solutions

There are a range of solutions which have been created to help with these problems. A **Business Angel network** can bring potential investors and small companies together, with the added bonus that the Business Angel may have expertise and experience to offer that could be useful in a small company situation. The owner of TFR Co may wish to look into this possibility.

There may be other government initiatives designed to help small businesses which could also be investigated.

40 Echo Co

> **Text references.** Dividend policy is covered in Chapter 13, gearing and capital structure in Chapter 14, sources of finance in Chapter 12 and operating leases in Chapter 11.
>
> **Top tips.** This is a wide-ranging sources of finance question which really tests your knowledge of this area of the syllabus. It is also very time pressured so don't spend too long on any one part. Use ratio analysis to support your discussion of financial risk.
>
> **Easy marks.** Part (c) is a straightforward regurgitation of textbook knowledge but make sure you answer the question and discuss the attractions of operating leasing rather than everything you know about leasing.
>
> **Examiner's comments**. In part (a), many candidates calculated correctly the increased dividend per share and then offered very little by way of discussion in order to gain any further marks.
>
> In part (b), the sector average debt/equity ratio (D/E) was provided, but many candidates chose to calculate capital gearing (D/(D + E)) in the mistaken belief that this was the debt to equity ratio. Comparison with the sector average gearing was therefore pointless, since the gearing ratios were on a different basis. Some candidates also calculated incorrectly the interest coverage, dividing interest into profit before tax or profit after tax, rather than into profit before interest and tax.
>
> It was surprising to see many candidates attempting to calculate the cost of debt (internal rate of return) of the bond issue. The bonds were to be issued and redeemed at par and so their cost of debt was the same as their interest rate, as these unnecessary calculations confirmed (where they were made correctly).
>
> In part (c), many candidates were able to calculate the theoretical ex rights price and the finance raised, and went on to calculate the effect of the rights issue on the gearing of the company. Some candidates mistakenly assumed that the proceeds of the right issue would be used to redeem some of the existing debt, but the question did not specify this and in practice this might not be possible. Very few candidates recognised that, just as with the proposal to make a bond issue, there had been no evaluation of the funding needs of the company.
>
> In part (d) many answers offered an explanation of operating leasing, but very little discussion of its attractions as a source of finance to a company. Many answers did not compare leasing as a source of finance with borrowing to buy.

Marking scheme

			Marks
(a)	Discussion of proposal to increase dividend		5
(b)	Evaluation of debt finance proposal	3–4	
	Discussion of debt finance proposal	4–5	
		Maximum	7
(c)	Theoretical ex rights price per share	1	
	Amount of finance raised	1	
	Evaluation of rights issue proposal	2–3	
	Discussion of rights issue proposal	3–4	
		Maximum	7
(d)	Discussion of attractions of leasing		6
			25

(a)   **Proposal A – Increasing the dividend per share**

The dividend paid last year was $2m which equates to 20c per share (2/5 × 0.5). A 20% increase would result in a dividend payment of **24c**, a total dividend of $2.4m (2 × 1.2). This would **reduce dividend cover** from 3 times (6/2) to 2.5 times (6/2.4).

Dividends as a signal to investors

The ultimate objective in any financial management decisions is to **maximise shareholders' wealth**. This wealth is basically represented by the **current market value** of the company, which should largely be determined by the **cash flows arising from the investment decisions** taken by management

Shareholders will look at a number of factors when analysing investments and not just dividends. They will be particularly interested in the **business** and **financial risk** of the company and will not necessarily be impressed with a large increase in dividends.

The dividend declared can be interpreted as a **signal** from directors to shareholders about the strength of underlying project cash flows. Investors usually expect a **consistent dividend policy** from the company, with stable dividends each year or, even better, **steady dividend growth**.

Modigliani and Miller

Modigliani and Miller (MM) proposed that in a tax-free world, shareholders are indifferent between dividends and capital gains, and the value of a company is determined solely by the 'earning power' of its assets and investments.

MM argued that if a company with investment opportunities decides to pay a dividend, so that **retained earnings** are **insufficient** to finance all its investments, the shortfall in funds will be made up by **obtaining additional funds** from outside sources. If a company pursues a consistent dividend policy, 'each corporation would tend to attract to itself a clientele consisting of those preferring its particular payout ratio, but one clientele would be entirely as good as another in terms of the valuation it would imply for the firm'.

Conclusion

The proposal to increase the dividend should be rejected as it will not generate any additional funds for the company and shareholders will not necessarily be attracted by the increase.

(b)   **Proposal B – Bond issue**

Gearing

Echo Co current debt/equity (book value basis) = 30/20 × 100% = 150%

After bond issue debt/equity = 45/20 × 100% = 225%

Average debt/equity = 80%

Echo Co is currently **very highly geared** with a debt to equity ratio based on book values of almost twice that of the average of similar companies. A bond issue would increase the gearing to even higher levels.

Interest coverage

Echo Co interest coverage ratio = 12/3 = 4 times

After bond issue interest coverage ratio = 12/(3 + (1.5) = 2.7 times

Average interest coverage ratio = 8 times

Echo Co currently has **half** the interest coverage of similar companies which indicates a much higher level of **financial risk.** The bond issue would further increase this risk and Echo could have difficulty making the interest payments.

The interest on the existing loan notes is $2.4m (8% × $30m) and the total interest charge in the income statement is $3m. This implies that Echo Co also has an **overdraft** which further increases the level of financial risk.

Lack of investment opportunities

There are currently no suitable investment opportunities available and the bond issue proceeds would be invested short-term. The return on short-term investments will be **lower** than the interest charged on the loan notes, so there will be an **opportunity cost** which will decrease shareholder wealth. There is a significant **risk** that a suitable investment opportunity requiring exactly $15m will not be found.

Loan redemption

The current loan notes are due to be redeemed in three years' time and this would be followed five years later by a repayment of the bond issue. This raises issues for the **financial planning** of the company which needs to consider how best to **refinance.**

Conclusion

The proposal to make a bond issue should be rejected as the level of financial risk is already too high.

(c)   **Proposal C – Rights issue**

Rights issue price = $2.30 × 80% = $1.84

Theoretical ex-rights price

	$
4 shares @ $2.30	9.20
1 share @ $1.84	1.84
5	11.04

Theoretical ex-rights price (TERP) = 11.04/5 = $2.21

Number of new shares to be issued = (5/0.5)/4 = 2.5 million

Amount of finance that would be raised = $1.84 × 2.5m = $4.6 million

Gearing

Current debt/equity = 30/20 = 150%

After rights issue debt/equity = 30/24.6 = 122%

As discussed in part (b), the current level of **financial risk** of Echo Co is unacceptably high and needs to be reduced. The rights issue would reduce the level of gearing to 122% but this is still higher than the average for similar companies.

Interest coverage

Current interest coverage ratio = 12/3 = 4 times

Current return on equity = 6/20 × 100 = 30%

Assuming the rate of return on the new equity will be the same:

After-tax return on the new funds = 4.6m × 30% = $1.38 million

Before-tax return on the new funds = 1.38m × (9/6) = $2.07 million

After rights issue interest coverage = (12 + 2.07)/3 = 4.7 times

The interest coverage ratio would improve after the rights issue but again, is still worse than the average for similar companies.

Purpose of the rights issue

The aim of the rights issue is to **reduce the level of gearing and the financial risk** of the company. To some extent, this would be achieved but, in order to make more of a significant impact, the level of debt would need to be reduced much further. The amount of refinancing required is much greater than $4.6m and there is no indication that a suitable investment has been identified.

Unless more information can be provided on how the rights issue proceeds could be effectively used, the rights issue proposal cannot be recommended.

Note: You could sensibly have assumed that the equity raised will be used to reduce debt – this will result in a different gearing calculation and interest coverage ratio

(d)   **Operating leases**

An operating lease is a lease where the lessor retains most of the risks and rewards of ownership. It is a rental agreement between a lessor and a lessee with the lessor **supplying** the equipment to the lessee. The lessor is **responsible** for **servicing and maintaining** the leased equipment

Protection against obsolescence

A key advantage of an operating lease for the lessee is that the equipment is leased for a **shorter period** than its expected useful life. In the case of high-technology equipment, if the equipment becomes out of date before the end of its expected life, the lessee does not have to keep on using it. The lessor will bear the risk of having to sell obsolete equipment secondhand.

Source of finance

As a source of finance, leasing is particularly attractive to small companies or those who find it **difficult to raise debt finance**. There is no commitment to interest payments, and no need to use existing assets for security. If the lessee gets into financial difficulties, the asset will simply be returned to the lessor who retains legal title.

Cost

The lessor may be able to obtain the asset at a **cheaper** price than the lessee. This can be due to bulk buying economies, lower finance costs and/or more effective use of tax benefits. The lower cost can then be passed on to the lessee in the form of lower lease payments.

Off-balance sheet financing

The leased equipment does not have to be shown in the **lessee's** published **balance sheet**, and so the lessee's balance sheet shows no increase in its gearing ratio.

41 JJG Co

Text reference. Measuring the achievement of objectives is covered in Chapter 1, rights issues and sources of finance in Chapter 12.

Top tips. In part (a) use the corporate objectives as headings for your financial analysis and calculate the ratios suggested by the given industry averages. Use a clear layout for your calculations to help the marker. Part (b) requires calculations and comments on the effect of the rights issue. Plan your answer to part (c) so that you answer the specific requirements of the question in sufficient detail.

Easy marks. There are plenty of easy marks available for the calculations in this question but don't spend too much time on the calculations at the expense of the discussion marks.

Examiner's comments. In part (a) many candidates had difficulty in calculating accounting ratios to compare with the sector averages provided. Many candidates did not understand the significance of the inclusion in the question of an average sector value for the return predicted by the CAPM.

Many answers to part (c) had little or no analysis and compared the three financing methods only in general terms.

ACCA examiner's answer. The examiner's answer to this question is included at the back of this kit.

			Marks
(a)	Relevant financial analysis	6–7	
	Shareholder wealth discussion	2–3	
	Earnings per share growth discussion	2–3	
	Comment on financial performance	1–2	
		Maximum	12
(b)	Share price calculation and comment	2–3	
	Earnings per share calculation and comment	2–3	
	Debt/equity ratio calculation and comment	1–2	
		Maximum	6
(c)	Financial analysis	1–2	
	Discussion of rights issue and placing	2–3	
	Discussion of bond issue	2–3	
		Maximum	7
			25

(a) **Financial analysis**

	20X8	20X7	20X6	20X5
Turnover ($m)	28·0	24·0	19·1	16·8
Turnover growth	17%	26%	14%	

Geometric average growth = $3\sqrt{\dfrac{28.0}{16.8}} - 1 = 18.6\%$

	20X8	20X7	20X6	20X5
Profit before interest and tax ($m)	9·8	8·5	7·5	6·8
PBIT growth	15%	13%	10%	

Geometric average growth = $3\sqrt{\dfrac{9.8}{6.8}} - 1 = 13.0\%$

	20X8	20X7	20X6	20X5
Earnings ($m)	5·5	4·7	4·1	3·6
Earnings per share (cents)	100	85	75	66
EPS growth	18%	13%	14%	

Geometric average growth = $3\sqrt{\dfrac{100}{66}} - 1 = 14.9\%$

	20X8	20X7	20X6	20X5
Dividends ($m)	2·2	1·9	1·6	1·6
Dividends per share (cents)	40	35	29	29
DPS growth	14%	21%	nil	

Geometric average growth = $3\sqrt{\dfrac{40}{29}} - 1 = 11.3\%$

	20X8	20X7	20X6	20X5
Ordinary shares ($m)	5·5	5·5	5·5	5·5
Reserves ($m)	13·7	10·4	7·6	5·1
Shareholders' funds ($)	19·2	15·9	13·1	10·6
8% Bonds, redeemable 20Y5 ($m)	20	20	20	20
Capital employed ($m)	39·2	35·9	33·1	30·6
Profit before interest and tax ($m)	9·8	8·5	7·5	6·8
Return on capital employed	25%	24%	23%	22%
Earnings ($m)	5·5	4·7	4·1	3·6
Return on shareholders' funds	29%	30%	31%	34%
8% Bonds, redeemable 20Y5 ($m)	20	20	20	20
Market value of equity ($m)	47·5	31·6	18·4	14·7
Debt/equity ratio (market value)	42%	63%	109%	136%

Share price (cents)	864	574	335	267
Dividends per share (cents)	40	35	29	
Total shareholder return				
$\dfrac{\text{Increase in sharevalue} + \text{Dividend}}{\text{Share value at start of period}}$	57%	82%	36%	

Evaluation of financial performance

The increase in **turnover** has been inconsistent whereas there has been a **continual growth in ROCE** to 25% in 20X8. This is now the same as the industry average.

Return on shareholder funds has been consistently higher than the 20% industry average, although it has declined every year. The **debt/equity ratio** has been falling as a result of the increase in shareholder funds, but until 20X8 it was higher than the industry average.

Maximising the wealth of shareholders

The wealth of shareholders is increased by dividends received and capital gains from the movement of share prices. **Total shareholder return** is a measure which combines the increase in share price and dividends paid. The shareholders of JJG Co had a total return of 57% in 20X8 compared with a **return predicted by the capital asset pricing model** of 14%. In 20X7 it was even higher at 82%.

It would therefore appear that shareholders wealth has increased by **more** than was to be expected. This may however have happened as a result of a **general increase** in share prices rather than the specific actions of the company. The share price is over 3 times higher in 20X8 than in 20X5 but dividends per share have not increased to the same extent. It is therefore difficult to know whether shareholder wealth has been maximised.

Achieving continuous growth in earning per share

Earnings per share have increased every year with an average growth rate of 14.9% This objective has therefore been achieved.

(b) (i) **Calculation of theoretical ex-rights price per share**

Current share price = $8·64 per share

Current number of shares = 5·5 million shares

Finance to be raised = $15m

Rights issue price = $7·50 per share

Number of shares issued = 15m/7·50 = 2 million shares

Theoretical ex rights price per share = ((5·5m x 8·64) + (2m x 7·50))/7·5m = **$8·34** per share

The **share price would fall** from $8·64 to $8·34 per share but there would be no effect on shareholder wealth.

(ii) **Effect of rights issue on earnings per share**

Current EPS = 100 cents per share

Revised EPS = 100 x 5·5m/7·5m = **73** cents per share

The **EPS would fall** from 100 cents per share to 73 cents per share but there would be no effect on shareholder wealth.

(iii) **Effect of rights issue on the debt/equity ratio**

Current debt/equity ratio = 20/47·5 × 100 = 42%

Revised market value of equity = 7·5m x 8·34 = $62·55 million

Revised debt/equity ratio = 20/62·55 × 100 = **32%**

The debt/equity ratio would **fall** from 42% to 32%, which is well below the sector average value and would signal a reduction in financial risk.

(c)　**Bond issue**

The **debt/equity ratio** is currently 42% (20/47.5 × 100) and is less than the sector average value of 50%.

The **interest coverage ratio** is a useful indicator of risk as it looks at the extent to which interest payments are covered by profits.

	20X8	20X7	20X6	20X5
Profit before interest and tax ($m)	9.8	8.5	7.5	6.8
Bond interest ($m) (8% × $20m)	1.6	1.6	1.6	1.6
Interest coverage ratio (times)	6.1	5.3	4.7	4.3

The interest coverage ratio has improved but is still **below** the industry average and is low enough to give cause for concern. It indicates that **more debt** would be **inadvisable**.

A bond issue would probably need to be **secured** and JJG Co would need to consider whether it has **sufficient non-current assets**.

Equity finance

A **placing** and a **rights issue** are both ways of issuing equity finance and would also **reduce gearing**. If the business expansion results in increased profits, **interest coverage** would also improve and financial risk would fall.

A **placing** is an arrangement whereby the shares are not all offered to the public, but instead, the sponsoring market maker arranges for most of the issue to be bought by a **small number of investors**, usually institutional investors such as pension funds and insurance companies. This would **dilute** ownership and control.

A **rights issue** is an offer to existing shareholders inviting them to subscribe cash for new shares in proportion to their existing holdings. Provided existing shareholders take up their rights, a rights issue **will not dilute** ownership and control.

A rights issue or a placing will not require **security** unlike a bond issue.

42 XYZ Co

Text references. Cost of capital is covered in Chapter 15 and sources of finance in Chapter 12.

Top tips. In (a), the actual values relating to the debt being raised have been used in the suggested solution. It would be equally appropriate to use values based on a $100 unit of debt. The exceptions to the rule about using WACC to appraise investments should be noted in (c). In (d) you should take into account operational as well as financial factors.

A table format for comparisons will not always be appropriate, but in (d) it provides a clear way of giving the detail needed on each option.

In (a) five marks were available for the two calculations necessary to find the IRR and three marks for the interpolation. In (b) you would have been given credit for using the cost of debt that you calculated in (a) and using market values of share capital and debt. In (c) most of the marks were available for explaining the importance of capital structure and financial risk. Answers to (d) needed to be quite broad to gain marks, covering cash flow, risk and security, but also mentioning financial reporting implications.

(a)　The **after tax cost of debt equates** to the **discount rate** at which the cost of the debt over the ten year period is zero. This can be estimated by trying different discount rates and then interpolating.

In order to raise $72m, XYZ Co must issue $80m of debt, since the debt is to be issued at a **discount** of 10% on par value ($72m ÷ 0.9 = $80m).

The **annual interest cost** net of tax will be $80m × 6%(1 − 0.3) = $3.6m.

The cash flows will be as follows:

Year		Cash flow $m	5% discount factors	PV $m	6% discount factors	PV $m
0	Issue proceeds	(72)	1.000	(72)	1.000	(72)
1-10	Interest	3.36	7.722	25.95	7.360	24.73
10	Capital repayment	80	0.614	49.12	0.558	44.64
				3.07		(2.63)

Calculate the cost of debt using an IRR calculation.

$$IRR = a\% + \left[\frac{NPV_a}{NPV_a - NPV_b} \times (b - a) \right]\%$$

$$= 5\% + \frac{3.07(6\% - 5\%)}{3.07 + 2.63} = 5.54\%$$

The **after tax cost of debt** is therefore 5.54%

(b) V_E = 200 million × $1.50

         = 300 million

$$WACC = \left(\frac{V_E}{V_E + V_D} \right) k_e + \left(\frac{V_D}{V_E + V_D} \right) k_d(1 - T)$$

$$= \left(\frac{300}{300 + 72} \right) \times 10 + \left(\frac{72}{300 + 72} \right) \times 5.54$$

$$= 9.14\%$$

(c) **Cost of debt**

The cost of debt is an inappropriate rate to use, as if fails to recognise **any impact** on **existing providers** of finance.

Return in excess of cost of capital

Any new investment undertaken by a company should generate a return in **excess** of the **overall cost of capital** to the company. This is the **minimum return** that a company should make on its own investments, to earn the cash flows out of which investors can be paid their return.

Use of WACC

The current **weighted average cost of capital** should generally be used to **evaluate projects**. This is because the **marginal cost of new capital** should be **roughly equal** to the **weighted average cost of current capital**, provided that the **company's capital structure changes slowly** over time.

Exceptions to use of WACC

(i)   Where the new investment has **different business risk characteristics** from the company's existing operations, and thus the **return required** by shareholders (**the cost of equity**) might **change** as a result of undertaking the investment.

(ii)   Where the **finance** that is raised to fund the new investment **substantially changes** the **capital structure** and the perceived **financial risk** of investing in the company.

Implications for XYZ

XYZ Co is a large listed company, and therefore the **size** of this **investment**, although large, is unlikely to have a significant impact on the capital structure. The project itself is concerned with the **replacement** of **existing assets**, and is therefore unlikely to change the level of business risk faced by the company. There is therefore no reason why the weighted average cost of capital should not be used in this case, and the after tax cost of the new debt should not therefore be used to evaluate the investment.

(d)   To: Board of Directors, XYZ Co
      From: Management Accountant
      Date: 11 December 20X1
      Subject: Choice of financing method

Introduction

This memorandum deals with the factors that should be considered when deciding which of the three methods of financing the grinding machines is the most appropriate.

Operational effects

These can be summarised as follows:

Option 1	Option 2	Option 3
Use of the machines **guaranteed** for the **full 10 year useful life.**	Use of the machines **guaranteed** for the **full 10 year useful life**.	Use of the machines would have to be **renegotiated annually**, with resulting insecurity.
XYZ **tied** into this **technology** for the full 10 year life of the machines. If the technology is superseded, change could be difficult and expensive.	XYZ **tied** into this **technology** for at least eight years of the ten year life of the machines.	The use of a series of annual contracts means that in the event of technological change, XYZ would be able to **adapt quickly** and would not need to write off obsolete plant.
XYZ responsible for **maintenance**.	**XYZ responsible** for **maintenance**.	**Lessor responsible** for **maintenance**. This could have quality implications.
Payables' **security** is a **fixed charge** over the machines and a **floating charge** over other assets.	Lessor's security is over the **machines alone.**	Lessor's security is over the **machines alone.**

Financial effects

Option 1	Option 2	Option 3
Interest payments on the debt interest would be **tax allowable**.	The **interest element** of the annual payments would be **allowable** against tax.	Although the lease rentals are higher than under option 2, they would be **fully tax allowable**.
XYZ would be able to **claim tax allowable depreciation** on the purchase of the machines.	**Tax allowable depreciation** is **not available**.	**Tax allowable depreciation** is **not available**.
Annual costs would be **low**, being only the interest payments on the debt.	Annual costs would be **higher** for the first eight years, but would be **insignificant** for the final two years.	**Annual costs** would be the **highest** for each of the ten years.
XYZ would have to **find $8m** to repay the debt at the end of the ten year period. Some of this might be recoverable from machine sale proceeds, but these are uncertain.	There would be **no terminal costs** at the end of the ten year period.	There would be **no terminal costs** at the end of the ten year period.
Key balance sheet ratios may be affected by including **assets** and **debt** on the balance sheet.	Key balance sheet ratios may be affected by including **assets** and **debt** on the balance sheet.	**Assets** and **finance** are **off balance sheet**.

Conclusions

The key factors to be considered are:

(i) **Operational**

Technological flexibility may be important, and **responsibility for maintenance** could prove expensive.

(ii) **Cash flow**

The different options have **different cash flow patterns**.

(iii) **Cost**

The total cost of the different options over the ten year life of the project should be evaluated using **discounted cash flow techniques**.

(iv) **Taxation**

The company should consider whether it could use all the **tax allowable depreciation** available under option 1, and whether it has sufficient annual income to benefit from the tax savings on expenses under options 2 and 3.

Signed: Management Accountant

43 D Co

Text references. Cost of capital is covered in Chapter 15.

Top tips. Unusually for gearing and WACC calculations the company has preference shares as well as equity shares and debt. As (a) does not specify which gearing ratio to use, you should begin your answer by stating how you are calculating gearing. Remember that you include reserves when you are calculating gearing using book values, and they should be excluded when you are calculating gearing using market values.

In (b) it is important to set out clearly which formula you're using; it demonstrates to the marker that you understand the principles. You wouldn't however need to define as we have done the symbols used in a formula that you are given on the exam paper. If you were unsure on how to calculate the cost of preference shares, you do so in exactly the same way as you calculate the cost of equity shares with g equalling 0. Note also that you do not adjust the cost of preference share capital for tax, but you must adjust the cost of loan notes for tax.

In (c) any answer on the CAPM must focus on the different types of risk.

In (d) you should consider the viewpoint of the investor as well as the viewpoint of the company.

(a) The **gearing ratio** can be calculated using the following expression:

$$\text{Gearing} = \frac{\text{Prior charge capital}}{\text{Prior charge capital} + \text{equity}}$$

(i) **Using book values**, prior charge capital includes:

	Book value $'000
9% loan notes	8,000
7% preference shares	1,000
	9,000
Equity:	
Ordinary share capital	2,000
Share premium account	1,100
Retained earnings	6,550
	9,650

$$\text{Gearing} = \frac{9,000}{9,000 + 9,650} = 48.3\%$$

(ii) Using **market values**, prior charge capital includes:

	Market value
	$'000
9% loan notes @ 80c per $1	6,400
7% preference shares @ 77c per $1	770
	7,170

Equity:

Ordinary shares @ $1.35 per 25c nominal value	10,800

$$\text{Gearing} = \frac{7,170}{7,170 = 10,800} = 39.9\%$$

(b) The **weighted average cost of capital** (WACC) can be found using the following expression:

$$\text{WACC} = \left[\frac{V_E}{V_E + V_P + V_D} \right] k_e + \left[\frac{V_P}{V_E + V_P + V_D} \right] k_{pref} + \left[\frac{V_D}{V_E + V_P + V_D} \right] k_d (1 - T)$$

where:

k_e = cost of equity
k_{pref} = cost of preference shares
$k_d (1 - T)$ = cost of debt (after tax)
V_E = market value of equity in the firm
V_P = market value of preference shares in the firm
V_D = market value of debt in the firm

The next step is to calculate the cost of the different sources of capital in D Co:

Cost of equity (k_e)

This can be found using the dividend growth model:

$$k_e = \frac{d_0(1 + g)}{p_0} + g$$

where: d_0 = current level of dividends
g = dividend growth rate in perpetuity
p_0 = current market price of equity

$$k_e = \frac{10(1 + 0.09)}{135} + 0.09$$
$$= 17.1\%$$

Cost of preference shares (k_{pref})

This can be found by dividing the preference dividend rate by the market price of the shares:

$$k_{pref} = \frac{7}{77}$$
$$= 9.1\%$$

Although preference shares are included with prior charge capital, the dividend is not allowable for tax, and therefore no adjustment needs to be made for this.

Cost of loan notes (k_{dnet})

The after tax cost of the loan notes can be found using the following expression:

$$k_d = \frac{i(1-T)}{p_0}$$

where: i = rate of debenture interest

   p_0 = market price of loan notes

   T = rate of tax

$$k_d = \frac{9(1-0.3)}{80}$$

   = 7.9%

The WACC can now be calculated:

$$WACC = \frac{(17.1 \times 10,800)}{17,970} + \frac{(9.1 \times 770)}{17,970} + \frac{(7.9 \times 6,400)}{17,970}$$

   = 13.5%

(c)   **Role of CAPM**

The **capital asset pricing model** (CAPM) provides an alternative to the dividend valuation model in calculating the cost of equity. Unlike the dividend valuation model, the CAPM seeks to differentiate between the various types of risk faced by a firm and to allow for the fact that new projects undertaken may carry a different level of risk from the existing business.

Systematic risk

The model focuses on the level of **systematic risk** attaching to the firm, in other words, that element of risk which is common to all investments and which cannot be avoided by diversification. The model uses the **beta factor** as a measure of an individual share's volatility of expected returns as against the market average. A beta factor of less than 1.0 indicates that the expected volatility is less than that of the market as a whole, and vice versa.

Formulation of model

The model can be formulated as follows:

$$E(r_i) = R_f + \beta_i (E(r_m) - R_f)$$

where: $E(r_i)$ = cost of equity capital
   β_i = beta factor for the firm's equity
   $E(r_m)$ = market rate of return
   R_f = risk free rate of return

Thus the additional information that would be required is as follows.

Beta factor

This can be calculated statistically from historical records of:

(i)   The **returns earned** by the **share** in terms of capital gains/losses and dividends
(ii)   The **overall returns** earned by the market

Market rate of return

The average annual rate of return on the securities market as a whole. This can be calculated from historical records.

Risk free rate of return

This is generally taken to be the rate of return on government bonds.

(d)   **Reasons for using loan notes**

    (i)   **Loan notes** are a **cheaper form of finance** than preference shares because debenture interest is tax deductible, unlike preference dividends.

    (ii)   **Loan notes** are **more attractive** to **investors** because they are secured against the company's assets.

    (iii)   **Debenture holders rank before preference shareholders** in the event of a liquidation.

    (iv)   **Issue costs** should be **lower for loan notes** than for preference shares.

44 IML Co

Text references. CAPM is covered in Chapter 15 and the efficient market hypothesis in Chapter 18.

Top tips. Although this looks like a question on the CAPM, the final part of the question requires a discussion of the efficient markets hypothesis and you may not have come across this yet in your studies. It is covered in part G of the syllabus and again illustrates that questions may cover different parts of the syllabus.

Note the requirement for the discussion in (c) to be comprehensible to a non-financial manager. Discussion of the assumptions and limitations of CAPM carried most marks in (c), although to score heavily the efficient markets hypothesis and the chairman's assertions also needed to be discussed, and the calculations carried out in (a) and (b) used in support.

(a)   The required rate of return on equity can be found using the capital asset pricing model:

$$E(r_i) = R_f + \beta_i (E(r_m) - R_f)$$

AZT Co

$$E(r_i) = 5\% + 0.7(15\% - 5\%)$$
$$= \textbf{12\%}$$

BOR Co

$$E(r_i) = 5\% + 1.4(15\% - 5\%)$$
$$= \textbf{19\%}$$

(b)   The beta for IML can be found using the same expression:

$$17\% = 5\% + \beta(15\% - 5\%) \, E(r_i)$$

$$\beta = \frac{(17\% - 5\%)}{(15\% - 5\%)}$$

The beta factor = 1.2

The **beta factor** is a measure of the volatility of the return on a share relative to the stock market. If for example a share price moved at three times the market rate, its beta factor would be 3.0. The beta factor indicates the level of **systematic risk**, the risk of making an investment that cannot be diversified away. It is used in the capital asset pricing model to determine the level of return required by investors; the higher the level of systematic risk, the higher the required level of return.

(c)   To: The Chairman
    From: Finance Director
    Date: 20 November 20X1
    Subject: The Capital Asset Pricing Model (CAPM) and stock market reactions

    (i)   **Assumptions and limitations of CAPM**

        Diversification

        Under the CAPM, the return required from a security is **related** to its **systematic risk** rather than its total risk. Only the risks that **cannot** be **eliminated** by diversification are **relevant.** The assumption is that investors will hold a **fully diversified portfolio** and therefore deal with the unsystematic risk themselves. However, in practice, markets are **not totally efficient** and investors do not all hold fully

diversified portfolios. This means that total risk is relevant to investment decisions, and that therefore the relevance of the CAPM may be limited.

Excess return

In practice, it is difficult to determine the excess return ($R_m - R_f$). **Expected rather than historical returns** should be used, although historical returns are used in practice.

Risk-free rate

It is similarly difficult to **determine the risk-free rate**. A risk-free investment might be a government security; however, interest rates vary with the term of the debt.

Risk aversion

Shareholders are risk averse, and therefore **demand higher returns** in compensation for increased levels of risk.

Beta factors

Beta factors based on historical data may be a **poor basis** for future **decision making**, since evidence suggests that beta values fluctuate over time.

Unusual circumstances

The CAPM is **unable** to **forecast accurately returns for companies** with **low price/earnings ratios**, and to take account of **seasonal 'month-of-the-year' effects** and **'day-of-the-week'** effects that appear to influence returns on shares.

Possible reasons for the apparent discrepancy in betas for AZT Co and BOR Co

The Chairman has expressed the view that AZT Co is a higher risk company than BOR because it operates in overseas markets. This factor gives rise to its **lower beta value**. Its returns are likely to have a **lower correlation** with those of the stock market as a whole, and therefore it has a **lower level of systematic risk**. It is also possible that the **level of total risk** faced by AZT Co is lower because it is **better diversified** than BOR.

Efficient markets hypothesis

The way in which the stock market responds to information released by a company can be understood with reference to the **efficient markets hypothesis** (EMH). It is generally accepted that most stock markets demonstrate a **semi-strong form** of **market efficiency**. This means that share prices **respond immediately** to all **publicly available information**, but not to information available only to insiders.

Implications of efficient markets hypothesis

- It is **not possible** consistently to **beat the market** (on a risk-adjusted basis) without the use of inside information
- **Past share prices** are **not** a **predictor** of future share prices
- The price of a share reflects **market expectations** of future performance
- Investors behave **rationally** and are not deceived by manipulation of accounting figures

(ii) **IML's position**

This can help to explain the situation of IML Co. The effect of an announcement of either profit or loss on the share price will not depend simply on the **magnitude** of the profit or loss, but in the relationship between the **announcement** and what the **market was expecting**. In this case, the company announced a loss and the share price rose. The market might have been expecting the **loss** to be **much larger** than it actually was, and the share price therefore adjusted in response to what was effectively good news. Alternatively, it could be that investors looked not simply at the loss, but at the **future prospects** of the company and decided that these were better than had been expected. The share price would then rise accordingly.

Signed: Finance Director

45 KJI

Text references. Shareholder ratios are covered in Chapter 1 and cost of capital in Chapters 15 and 16.

Top tips. The main difficulty in part (a) is answering all the parts in the time available; providing explanations, uses and limitations is a lot to do in the time you are given. You would maximise your mark-scoring by giving some commentary on every ratio as well as calculating them.

Part (b) is asking you not to describe the changes but to **explain why** they happened. It thus tests your imagination and your understanding of the most plausible reasons for changes – a share capital increase is caused by a share issue, but what sort of share issue? The question also tests your understanding of the **interaction** of various ratios; a decision to increase dividends may leave the dividend yield unchanged, but it may cause the dividend cover to fall. You also would gain credit by linking events (company buying back shares) with impact on market and share price (market becomes uncertain of company's intentions.)

Part (c) is another weighted average cost of capital calculation with the complications of preference shares and tax. Part (d) demonstrates why WACC should be used by companies for assessing investment. If you are unsure about this, think about the effect of the new funding and investments on the overall capital structure of the firm, and the implications of this for raising finance in the future.

(a)

		20X6	20X7	20X8	20X9
1	Equity earnings ($m)	200	225	205	230
2	Number of shares (m)	2,000	2,100	2,100	1,900
3	Price per share (cents)	220	305	290	260
4	Dividend per share (cents)	5	7	8	8
	Solution:				
5	Earnings per share (=1 ÷ 2)	10.0c	10.7c	9.8c	12.1c
	Dividend yield (= 4 ÷ 3)	2.3%	2.3%	2.8%	3.1%
	Dividend cover (= 5 ÷ 4)	2.0	1.5	1.2	1.5 times
	Price/earnings ratio (= 3 ÷ 5)	22.0	28.5	29.6	21.5 times

Earnings per share

Earnings per share (EPS) shows the amount of profit after tax attributable to each ordinary share. Although a high EPS generally indicates success, care must be taken in interpreting the trend in EPS when there have been **share issues**, especially rights issues at heavily discounted prices or bonus issues, both of which result in a fall in EPS. Similar problems are encountered when warrants or convertible loan notes are issued.

Dividend yield

The **dividend yield** shows the ordinary dividend as a rate of return on the share value. The figures shown in this example are *after* basic rate income tax, whereas they are normally shown gross. The figure is of limited use because it shows **only part of the return** to the **equity investor**.

Dividend cover

The **dividend cover** shows how many times bigger the EPS is than the dividend per share. A **high dividend cover** shows that a **large proportion** of **equity earnings** is being **reinvested for growth**.

Price/earnings ratio

The **price/earnings ratio** (P/E ratio) shows how many times bigger the share price is than the EPS. In general, the bigger the EPS, the more the share is in demand, though care must be taken when making comparisons because whereas EPS is a historical result, the **share price** is **based** on **future expectations** and is affected by both risk and growth factors. Consequently, abnormal results can often arise from a crude use of P/E ratios.

(b)   **Trends in 20X7**

In 20X7, **share capital was increased by 5%,** probably through a **rights issue**. Equity earnings increased more than proportionately, resulting in a 7% increase in EPS, indicating a successful year. **Demand** for the company's **shares rose swiftly**, either because of a **general stock market rise** or because of **high expectations** of KJI's future growth, and the share price rose by approximately 40%. This caused a **big rise in P/E** and allowed a 40% increase in dividend per share with no fall in dividend yield. The dividend cover fell, however, because the dividend increased much more than earnings.

Trends in 20X8

The company's **earnings and EPS fell in 20X8**, either because of normal cyclical business risks or possibly because the high 20X7 dividend left insufficient cash for reinvestment. However, the company gave a 'bullish' signal to the market by **increasing** its **dividend per share**, indicating future prospects of a swift recovery and increased growth. As a result, the **dividend yield increased** and, although the share price fell in line with earnings, there was no disproportionate drop in demand for the company's shares, as shown by the stability of the P/E.

Trends in 20X9

There was 12% **earnings growth** in 20X9. The company used some of its cash to **buy back ordinary shares**. This is possibly because it offered shareholders the choice between a cash and a scrip dividend. Share capital reduced by about 10%, resulting in a big increase in earnings per share. Although 20X9 was a successful year for earnings, **demand for the company's shares fell**, as shown by the drop in share price and P/E. It is possible that the market has become **uncertain** of the company's **future plans** as a result of the share issue and share buy-back in quick succession.

(c)   **Assumptions**

It is assumed that the **market prices** of the shares and loan notes are **quoted excluding dividend** and interest. Since the WACC is to be calculated based on market values, the cost of reserves can be ignored.

Cost of equity

The dividend valuation model taking into account growth will be used.

$$k_e = \frac{d_1}{p_0} + g$$

where:	k_e	=	cost of equity
	d_1	=	next year's dividends
	g	=	annual rate of growth in dividends
	p_0	=	market price of shares (ex div)
In this case:	k_e	=	$4/80 + 0.12$
		=	17.0%

Cost of preference shares

	k_{pref}	=	d/p_0
where:	k_{pref}	=	cost of preference shares
	d	=	preference dividend (9c)
	p_0	=	market price of shares (72c)
	k_{pref}	=	$9/72$
		=	12.5%

Cost of loan notes

It is assumed that the loan notes are irredeemable. The after tax cost to the company will be calculated.

$$k_d = \frac{i(1-T)}{p_0}$$

where: k_d =   cost of loan notes
         I   =   annual interest payment (14c)
         p_0 =   market price of loan notes (100c)
         T   =   rate of tax (33%)

         k_d = $\dfrac{14(1-0.33)}{100}$

             =   9.4%

Weighted average cost of capital (WACC)

	No in issue $	Market price $	Market Value $
Equity	10,400,000	0.80	8,320,000
Preference shares	4,500,000	0.72	3,240,000
Loan notes	5,000,000	1.00	5,000,000
			16,560,000

$$\text{WACC} = 17.0 \left[\frac{8{,}320}{16{,}560}\right] + 12.5 \left[\frac{3{,}240}{16{,}560}\right] + 9.4 \left[\frac{5{,}000}{16{,}560}\right] = 13.8\%$$

(d)   **Required rate of return**

It is not usually correct to regard the **required rate of return** for an individual project as the cost of the actual source of funds that will be used to finance it, even where the funds can be traced directly. Debt is cheaper than equity only because there is an **equity base** which takes the risk – if the equity funds were not there then the company could not borrow. Each year some profits should be retained to increase the equity base, thus allowing further borrowing to take place. The borrowing is not independent of equity funds, and thus it is appropriate to combine the two in arriving at the cost of capital to be used in project appraisal.

WACC

The WACC reflects the company's **long-term capital structure**, and therefore capital costs. The capital structure generally changes only very slowly over time, and therefore the marginal cost of new capital should be approximately equal to the WACC. The **WACC** is therefore a more appropriate yardstick for the evaluation of new projects.

(ii)   Managers should be **discouraged** from attempting to **manipulate** their **accounting results**, since the truth will be realised quickly, and prices adjusted accordingly.

(iii)   The company may concentrate on producing **constantly improving financial results** at the expense of the company's **responsibility** to **other stakeholders** in the business, such as its employees and the environment.

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Text references. Cost of capital is covered in Chapter 15, capital structure theories in Chapter 16 and sources of finance in Chapter 12.

Top tips. In part (a) make sure you recognise that the debt is redeemable and use market values for the WACC. In the written parts of the question, you must focus on the question requirements and not just write everything you know about different sources of finance.

(a)   **Cost of equity**

$$k_e = \frac{d_0(1+g)}{P_0} + g$$

$$= \frac{1(1+0.04)}{10.40} + 0.04$$

$$= 14\%$$

Cost of debt

Year		Cash Flow $	Discount Factor 10%	PV $	Discount Factor 5%	PV $
0	Market value	(100.84)	1.000	(100.84)	1.000	(100.84)
1-3	Interest (after tax)	6.30	2.487	15.67	2.723	17.15
3	Capital repayment	100.00	0.751	75.10	0.864	86.40
				(10.07)		2.71

$$k_d = \left(5 + \left(\left(\frac{2.71}{2.71 - -10.07}\right) \times (10 - 5)\right)\right)$$

$$= 6.06\%$$

WACC

$$WACC = \left(\frac{V_E}{V_E + V_D}\right) k_e + \left(\frac{V_E}{V_E + V_D}\right) k_d$$

$$V_E = 100 \times 10.40$$
$$= \$1,040 \text{ million}$$

$$V_D = 200 \times 1.0084$$
$$= \$201.68 \text{ million}$$

$$WACC = \left(\frac{1,040}{(1,040 + 201.68)}\right) \times 14 + \left(\frac{201.68}{(1,040 + 201.68)}\right) \times 6.06$$

$$= 12.71\%$$

(b)   (i)   **Cost of equity**

The **cost of equity** will **rise** if the company takes out extra loans. The **interest and debt repayment** burden will increase the risk that WEB will not be able to pay dividends, and also increase the risk that WEB will run into financial difficulties through not being able to meet its loan commitments. If liquidation occurs, debtholders will rank before equityholders. Equity investors will demand an increased level of return to compensate for this risk.

(ii)   **Cost of debt**

According to the traditional view, the **cost of debt** will remain unchanged up to a certain level of gearing. Above that level it will increase, because of the financial risk that the company will not be able to meet its commitments, and hence interest or even principal lent may be jeopardised.

(iii)   **Weighted average cost of capital**

According to the traditional view, the **weighted average cost of capital** will fall initially as debt capital is introduced, because debt at first has a lower cost than equity, being a lower-risk investment. Ultimately however the weighted average cost of capital will rise as risk levels increase, resulting in the rise in the cost of equity becoming more significant, and ultimately the cost of debt will rise. The **optimum level of gearing** is where **the company's weighted average cost of capital is minimised**.

(c)   **Bank loan**

A **bank loan** is a loan of a specific amount from a bank for a set period. **Repayment** may be in **instalments** or at the end of the **loan**, and **interest** will be payable on the amount outstanding. Security is likely to be in the form of a **floating charge** over the company's assets.

Loan notes

Loan notes are issued by the company, backed by a **written acknowledgement** of the debt given under seal containing **provisions** on **payment of interest** and the **terms of repayment of principal.** It may be held by more than one lender. Loan notes of listed companies can be **traded**, and they may be **redeemable** (repayable at a certain time), **convertible** (can be converted into share capital at a certain time) or **irredeemable.**

The cost of debt may differ because:

(i)   Loan note holders can **trade** the loan notes and may therefore accept a lower yield in return for **better liquidity**.

(ii)   The **security** that the bank demands may differ from the security given to the loan note holders. A lower rate of interest may be accepted in return for stronger security.

(iii)   The loan notes cover a **different period** from the bank loan. When the loan notes were issued, expectations about the **level of interest rates** and the **business and financial risks faced by WEB** may have been different.

(d)   **Convertibles**

Companies normally issue convertibles in the expectation that the **holders will exercise their options**. Convertibles can therefore be seen as a form of **delayed equity**.

(i)   They are **attractive** to the firm when the price of the ordinary shares is abnormally low at the date of issue, and at times when to issue a further tranche of equity would result in a significant drop in earnings per share.

(ii)   However they also carry the **risk** that the **share price will not rise in line** with expectations at the time of issue and that holders will not therefore convert.

(iii)   If the loan notes are dated, then the company must have funds in place to allow redemption on the due date.

(iv)   Convertibles also have a short-term benefit in that **interest payments** are **allowable against tax**.

Strategic implications of convertibles

Convertibles therefore may form part of the strategy of a company whose objective is to raise new equity, but which for various reasons does not wish to go directly to the market in the short term.

(i)   They are often preferable to straight loan notes since they **do not commit the company indefinitely** to the payment of large interest bills.

(ii)   They further allow the company to **widen the investment base** by attracting investors looking for a guaranteed short term income plus the possibility of a capital gain at a later date.

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Text references. The capital asset pricing model is covered in Chapter 15.

Top tips. In (a) you should give a brief definition of the beta factor and what it measures. This will help you to explain the implications of a beta factor of less than one. Remember that preference shares do not count as equity for these purposes and should be ignored at this stage of the calculations.

In (b) there are a number of valid approaches that can be used to find the cost of the loan notes. The most usual of these, using the internal rate of return, is described in the suggested solution. Using 5% as we have means you only need to calculate one rate. It is equally correct to use a higher and lower rate, say 7% and 4%, and then to use interpolation to find the discount rate at which the NPV approaches zero.

In (c) you may find it helpful to think in terms of financial factors and factors affecting the level of business risk when structuring your answer.

Easy marks. Limitations of CAPM should always represent straightforward marks.

(a)   The cost of equity can be found using the following formula:

$$E(r_i) = R_f + \beta_i (E(r_m) - R_f)$$

where $E(r_i)$ is the cost of equity capital – expected equity return
R_f is the risk-free rate of return
$E(r_m)$ is the return from the market as a whole
β is the beta factor of the individual security

Here: R_f = 5% (annual yield on treasury bills)
$E(r_m)$ = 15%
β_i = 0.8
$E(r_i)$ = 5% + (15% − 5%)0.8
= 13%

The required rate of return on equity of CAP Co at 30 September 20X2 is therefore 13%.

Beta factor levels

The beta factor is a measure of **systematic risk**, that is, the element of risk that cannot be avoided by **diversification**. The beta factor measures the **variability in returns** for a given security in relation to the variation in returns for the market as a whole.

A beta factor of 1.0 means that if the market goes up by x%, all other things being equal, one would expect the return on the security to go up by x% as well. A beta factor of less than 1.0 means that the return on the security is likely to be less variable than the return on the market as a whole. A beta value of 0.8 means that if the market returns go up by 5%, the return on the security would only be expected to go up by 4% (5% × 0.8). Similarly, if the market returns fall by 5%, the return on the security would only be expected to fall by 4%.

(b)   **Weighted average cost of capital**

The weighted average cost of capital (WACC) is the **average cost** of the **company's finance** weighted according to the proportion each element bears to the total pool of capital. Weighting is usually based on market values, current yields and costs after tax. Where market values can be used, as in this case, reserves can be ignored.

Equity

The cost of equity has already been calculated at 13%.

The market value of equity (V_E) is the number of shares in issue multiplied by the market price (ex div):

V_E =   200m × $3
= $600m

Preference shares

Preference shares are irredeemable. The interest on preference shares is not tax deductible. The cost of the preference shares (k_{Pref}) is therefore:

$k_{pref} = D/p_0$

where: D =   annual dividend in perpetuity
P_0 =   current ex div price
k_{pref} =   9%/0.90
=   10%

The market value of the preference shares (V_P) is the number of shares in issue multiplied by the market price (ex div):

V_P = 50m × $0.90

= $45m

Loan notes

The loan notes pay interest of 8%, which is allowable against tax. Tax is paid at the end of the year in which taxable profits arise, in other words, at the same time as the interest payment at the end of year 1.

Since the net cost of the interest is 5.6% (8% × 0.7), and the current market price of the notes is just above par, we will try an initial rate of return of 5%.

Year		Cash flow $	5% disc factors	Present value $	
0	Market value	(100.57)	1.00	(100.57)	
1	Interest	8.00	0.952	7.62	
1	Tax saved	(2.40)	0.952	(2.28)	
1	Redemption	100.00	0.952	95.20	
Net present value					(0.03)

This net present value is virtually zero, and therefore the effective cost of the loan notes is 5%.

The market value of the loan notes (V_D) is the number of units in issue multiplied by the market price:

V_D = 250m × $100.57/100.00

= $251.4m

WACC

	MV
Equity	600.0
Preference shares	45.0
Loan notes	251.4
Total	896.4

$$\text{WACC} = \left[\frac{V_E}{V_E + V_P + V_D}\right] k_e + \left[\frac{V_P}{V_E + V_P + V_D}\right] k_{pref} + \left[\frac{V_D}{V_E + V_P + V_D}\right] k_d$$

$$= \left[\frac{600.0}{896.4}\right] \times 13 + \left[\frac{45}{896.4}\right] \times 10 + \left[\frac{251.4}{896.4}\right] \times 5$$

$$= 10.6\%$$

(c) **Factors affecting equity beta**

CAP Co's equity beta will be affected by factors that change the perceived **volatility in returns** to the ordinary shareholders. These will include **financial factors**, such as the **change in gearing**, and other factors related to effect of the new investment on the systematic risk of the company's activities.

Rise in gearing

Following the new issue of loan notes, the **gearing will rise**. This in turn is likely to affect the **volatility** of the returns to equity in relation to the market index. As a consequence, the beta may rise.

Effect of diversification

Since the returns on the campsite business are likely to have a very **low correlation** with those of the existing farming business, the effect of the new investment will be to **smooth out the earnings pattern**. This will reduce the volatility of the returns to equity. However the beta value will be affected by how the **campsite returns vary** in relation to **returns on the market portfolio**, and they may **vary more or less** than the **returns from the farming activities**. The equity beta will be the weighted average of the betas of the two sorts of activity.

Refinancing

As well as raising new debt, the company also has to redeem its existing debt in 20X3. If it replaces existing debt with similar debt, there will be little or no effect on the beta. However, if the debt is **replaced by equity** and gearing reduced, volatility of returns on equity and hence the **beta factor** are likely to fall**.**

Investor perceptions

This is a major diversification by CAP, and investors may perceive this to be a **risky strategy**. As a consequence in the short-term, the beta could rise to reflect this. Investors may feel that CAP managers **lack the skills required** to manage campsites, as managing camping sites is a very different job from farming. As a consequence this will increase the risk of the new investment, and hence the equity beta may rise. There are also **start-up costs** associated with the new investments. These may depress the profits in the first year of trading, which in turn may cause investors to perceive the new business to be riskier than it really is. The effect of this will be to cause a short-term rise in the beta value.

Industry

Events within the farming and tourism industries, and perceptions of how they are doing, may also affect the beta levels.

(d)   **Diversification**

Under the CAPM, the return required from a security is **related** to its **systematic risk** rather than its total risk. Only the risks that **cannot** be **eliminated** by diversification are **relevant.** The assumption is that investors will hold a **fully diversified portfolio** and therefore deal with the unsystematic risk themselves. However, in practice, markets are **not totally efficient** and investors do not all hold fully diversified portfolios. This means that total risk is relevant to investment decisions, and that therefore the relevance of the CAPM may be limited.

Excess return

In practice, it is difficult to determine the excess return (R_m – R_f). **Expected rather than historical returns** should be used, although historical returns are used in practice.

Risk-free rate

It is similarly difficult to **determine the risk-free rate**. A risk-free investment might be a government security; however, interest rates vary with the term of the debt.

Risk aversion

Shareholders are risk averse, and therefore **demand higher returns** in compensation for increased levels of risk.

Beta factors

Beta factors based on historical data may be a **poor basis** for future **decision making**, since evidence suggests that beta values fluctuate over time.

Unusual circumstances

The CAPM is unable to forecast accurately returns for companies with low price/earnings ratios, and to take account of seasonal 'month-of-the-year' effects and 'day-of-the-week' effects that appear to influence returns on shares.

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Text reference. Calculating a project-specific cost of capital is covered in Chapter 16.

Top tips. The calculations in this question should be quite straightforward provided you have practised using the formulae. Follow a logical approach to part (b). Set out your workings clearly so that, even if you make a mistake, you can gain maximum marks for the method used.

Over half of the marks are available for discussion so, as we say in the Passing F9 section of the front pages of this kit, make sure you are able to discuss as well as use these techniques.

Easy marks. You must learn the problems associated with the capital asset pricing model as this is a highly examinable topic and could provide easy marks in your exam.

(a) **After-tax cost of debt**

Year		Cash flow $	Discount Factor 10%	PV $	Discount factor 5%	PV $
0	Market value	(90)	1.000	(90.00)	1.000	(90.00)
1–10	Interest (net of tax)	7	6.145	43.02	7.722	54.05
10	Capital repayment	100	0.386	38.60	0.614	61.40
				(8.38)		25.45

The approximate cost of redeemable debt capital is, therefore:

$$5 + \left(\frac{25.45}{25.45 - -8.38} \times (10 - 5) \right) = 8.76\%$$

(b) **Project-specific beta**

$$\beta_a = \beta_e \frac{V_e}{V_e + V_d (1 - T)}$$

where: β_a = asset beta
  β_e = equity beta
  V_e = proportion of equity in capital structure
  V_d = proportion of debt in capital structure
  T = tax rate

For the competitor company:

$$\beta_a = 1.4 \left(\frac{35}{35 + 65(1 - 0.30)} \right) = 0.609$$

Re-gearing:

$$\beta_e = \frac{\beta_a(V_e + V_d(1 - T))}{V_e}$$

$$\beta_e = \frac{0.609(40 + 60(1 - 0.3))}{40} = 1.248$$

Cost of equity

$$E(r_i) = R_f + \beta (E(r_m) - R_f)$$

where: $E(r_i)$ = cost of equity
  R_f = risk free rate of return
  $E(r_m)$ = market rate of return
$E(r_i)$ = 6.75% + (12.5% − 6.75%) × 1.248 = 13.93%

WACC
(13.93 × 0.4) + (8.76 × 0.6) = 10.83%

Note: This final step of calculating the WACC is shown for completeness and is unlikely to be tested in the exam.

(c) **The capital asset pricing model**

The discount rate has been calculated using the **capital asset pricing model** (CAPM). The CAPM produces a required return based on the expected return of the market $E(r_m)$, the risk-free interest rate (R_f) and the variability of project returns relative to the market returns (β). Its main advantage when used for investment appraisal is that it produces a discount rate which is based on the **systematic** risk of the individual investment. Systematic risk is the market risk which cannot be diversified away. It can be used to **compare projects of all different risk classes** and is therefore superior to an NPV approach which uses only one discount rate for all projects, regardless of their risk.

Practical problems

Problems in estimating

It is **hard to estimate** returns on projects under different economic environments, market returns under different economic environments and the probabilities of the various environments.

Single period model

The CAPM is really just a **single period model**. Few investment projects last for one year only and to extend the use of the return estimated from the model to more than one time period would require both project performance relative to the market and the economic environment to be reasonably stable.

Complications over time

In theory, it should be possible to apply the CAPM for each time period, thus arriving at successive discount rates, one for each year of the project's life. In practice, this would exacerbate the estimation problems mentioned above and also make the discounting process much more cumbersome.

Risk-free rate

It may be **hard to determine the risk-free rate of return**. Government securities are usually taken to be risk-free, but the return on these securities varies according to their term to maturity.

Beta formula

There are also problems with using the **geared and ungeared beta formula** for calculating a firm's equity beta from data about other firms. It is difficult to identify other firms with **identical operating characteristics** and there may be **differences in beta values** between firms caused by different cost structures or size differences between firms.

(d) **Pecking order theory**

Pecking order theory has been developed as an alternative to traditional theory. It states that firms will prefer retained earnings to any other source of finance, and then will choose debt, and last of all equity. The order of preference will be:

- Retained earnings
- Straight debt
- Convertible debt
- Preference shares
- Equity shares

Consequences of pecking order theory

Businesses will try to match **investment opportunities** with **internal finance** provided this does not mean excessive changes in dividend payout ratios. If it is **not possible** to **match investment opportunities** with **internal finance**, surplus internal funds will be invested; if there is a deficiency of internal funds, external finance will be issued in the pecking order, starting with straight debt.

Establishing an **ideal debt-equity mix** will be problematic, since internal equity funds will be the first source of finance that businesses choose, and external equity funds the last.

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Marking scheme

			Marks
(a)	Calculation of market values	2	
	Calculation of cost of equity	2	
	Calculation of cost of preference shares	1	
	Calculation of cost of debt	2	
	Calculation of WACC	2	
			9
(b)	Relative costs of equity and debt	1	
	Discussion of theories of capital structure	7-8	
	Conclusion	1	
	Maximum		8
(c)	Analysis of interest coverage ratio	2-3	
	Analysis of financial gearing	2-3	
	Analysis of earnings per share	2-3	
	Comment	2-3	
	Maximum		8
			25

(a) **Weighted average cost of capital**

Market values	$ million
Equity (5m × $4.50)	22.500
Preference shares (2.5m × $0.762)	1.905
10% loan notes (5m × (105/100))	5.250
	29.655

Cost of equity using dividend growth model $= \dfrac{D_0(1+g)}{P_0} + g$

$$= \frac{35(1+0.04)}{450} + 0.04$$

$$= 12.09\%$$

Cost of preference shares $= \dfrac{D}{P_0} = \dfrac{9}{76.2} = 11.81\%$

Cost of debt:

Year		Cash flow $	Discount factor 10%	PV $	Discount factor 5%	PV $
0	Market value	(105)	1.000	(105)	1.000	(105)
1 – 8	After tax interest	7	5.335	37.34	6.463	45.24
8	Redemption	100	0.467	46.70	0.677	67.70
				(20.96)		7.94

Using interpolation, cost of debt $= a + \left(\dfrac{NPV_a}{NPV_a - NPV_b} \right) (b - a) \%$

$$= 5 + \left(\frac{7.94}{7.94 + 20.96} \times 5 \right)$$

$$= 6.37\%$$

WACC $= [(12.09\% \times 22.5) + (11.81\% \times 1.905) + (6.37\% \times 5.25)]/29.655 = 11.05\%$

(b) **Sources of finance**

The sources of long-term finance for Droxfol Co are ordinary shares, preference shares and loan notes and the rate of return expected by investors depends on the **relative risks** of each type of finance. Equity is the most risky and therefore has the highest cost of capital and the loan notes are the least risky with the lowest cost of capital.

Therefore, if we ignore taxation, the weighted average cost of capital would be expected to decrease if equity is replaced by debt.

Traditional view

In the **traditional view** of capital structure, ordinary shareholders are relatively **indifferent** to the addition of small amounts of debt so the WACC falls as a company gears up.

However, as equity is replaced by debt and gearing increases, **financial risk** will increase so the cost of equity will rise and this will offset the effect of cheaper debt.

The before-tax cost of debt will also increase at high levels of gearing due to the risk of bankruptcy and this **bankruptcy risk** will further increase the cost of equity.

A company can therefore gear up using debt and reduce its WACC to a **minimum**. When the WACC is minimised, the **market value** of the company, equal to the present value of its cash flows, will be maximised.

Beyond this minimum point, the WACC will increase due to the effect of increasing financial and bankruptcy risk.

Modigliani and Miller

In contrast to this traditional view, **Modigliani and Miller**, assuming a perfect market and ignoring tax, demonstrated that the WACC remained constant as a company increased its gearing. They argued that the increase in the cost of equity due to financial risk **exactly balanced** the decrease in WACC caused by the lower before-tax cost of debt.

In a perfect capital market, there is no bankruptcy risk so the WACC and therefore the market value of the company is constant at all gearing levels. The market value of a company depends on its **business risk** only. This means that Droxfol Co cannot reduce its WACC to a minimum.

However, corporate tax does exist and interest payments on debt reduce tax liability, so it could be argued that WACC falls as gearing increases and Droxfol Co could reduce its WACC to a minimum by taking on as much debt as possible.

The assumption of a perfect capital market is unrealistic and so bankruptcy risk and other costs of servicing debt will increase as gearing increases and this will offset the value of the tax shield.

Conclusion

In conclusion, Droxfol Co should be able to reduce its WACC by gearing up, but the minimum WACC achievable may be hard to determine.

(c)   (i)   **Interest coverage ratio**

Current interest coverage ratio = 7,000/500 = 14 times
Increased profit before interest and tax = 7,000 × 1.12 = $7.84m
Increased interest payment = $0.5m + ($10m × 9%) = $1.4m
Interest coverage ratio after one year = 7.84/1.4 = 5.6 times

The current interest coverage of Droxfol Co is higher than the sector average of 12 times and can be considered quite safe. However, after the new issue of loan notes, the interest coverage ratio falls to less than half of the sector average and could indicate that Droxfol Co may find it difficult to meet the interest payments.

(ii)   **Financial gearing**

$$\text{Financial gearing} = \frac{\text{Prior charge capital}}{\text{Equity share capital}}$$

$$\text{Current financial gearing at book values} = \frac{5,000 + 2,500}{5,000 + 22,500} \times 100 = 27.3\%$$

Ordinary dividend after one year = $0.35 × 5m × 1.04 = $1.82 million

Preference dividend = 2,500 × 0.09 = $225,000

INCOME STATEMENT AFTER ONE YEAR

	$'000	$'000
Profit before interest and tax		7,840
Interest		(1,400)
Profit before tax		6,440
Income tax expense		(1,932)
Profit for the period		4,508
Preference dividends	225	
Ordinary dividends	1,820	
		(2,045)
Retained earnings		2,463

$$\text{Financial gearing after one year} = \frac{5,000 + 10,000 + 2,500}{5,000 + 22,500 + 2,463} = 58.4\%$$

The current financial gearing of Droxfol Co is around 40% ((45 − 27.3)/45) less than the sector average. After the loan note issue, it is predicted to be 30% ((58.4 − 45)/45) more than the sector average. This increase in, and level of, financial gearing may be of concern to investors and the stock market. However, if the company continues to grow at 12% per annum, financial gearing will gradually reduce as the proportion of debt to equity falls.

(iii)   **Earnings per share (EPS)**

$$\text{EPS} = \frac{\text{Profit attributable to ordinary shareholders}}{\text{Number of ordinary shares}}$$

$$\text{Current EPS} = \frac{4,550 - 225}{5,000} = 0.865 = 86.5 \text{ cents per share}$$

$$\text{EPS after one year} = \frac{4,508 - 225}{5,000} = 0.857 = 85.7 \text{ cents per share}$$

Any decrease in EPS tends to be disliked by investors as it is seen as a key ratio. However, this decrease is relatively small and the expected future growth in earnings should quickly reverse it.

In conclusion, the issue of new debt is likely to have a **negative impact** on the company's financial position at least in the short-term.

Droxfol Co will also need to consider whether it has sufficient non-current asset **security** for a new debt issue as the existing loan notes are already secured on the existing assets. The new loan notes may need to be secured on any new non-current assets bought which may not be sufficient.

The company must also consider the future **redemption** of the loan notes. The existing loan notes are due to be redeemed in eight years' time and an additional need for re-financing only two years later may cause difficulties. They may need to consider a **longer maturity** for the new loan notes.

In view of this, Droxfol Co should also consider an **equity issue** and compare its potential impact on the company's financial position.

50 Burse Co

Text references. Cost of capital is covered in Chapter 15.

Top tips. In part (a), the cost of equity has to be calculated using the capital asset pricing model (CAPM) as there is insufficient data in the question to use the dividend growth model. The risk-free rate of return, the equity beta and the equity risk premium (this is the difference between the market return and the risk-free return) are given, and so the cost of equity can be calculated from the CAPM formula. For the convertible debt calculation you need to assume that conversion is likely to occur, and then calculate the cost of debt using the current market value, the after-tax interest rate, the conversion value after six years and use the IRR method.

Part (b) is a straightforward discussion, provided you have done the necessary reading.

If you understand the formula for the dividend growth model, part (c) should be a straightforward explanation of the uncertainties behind each variable in the formula. You can take a similar approach with the capital asset pricing model.

Easy marks. Each part of the calculations in part (a) will gain marks so, if you get stuck, make an assumption and move on. Don't spend too long on this part of the question as there are plenty of easier marks available in parts (b) and (c).

Examiner's comments. Answers to part (a) of the question were of variable quality. A common error was to confuse the equity risk premium with the return on the market, resulting in a cost of equity less than the cost of debt. Such a result is inconsistent with the risk-return hierarchy.

Many candidates ignored the bank loan, or assumed that it was not relevant, and lost credit as a result.

Finding the cost of debt of the convertible bonds proved to be a challenge for many candidates. Some candidates stated simply that they assumed the bonds were to be redeemed rather than converted and lost marks as a result, even if they calculated correctly the cost of debt of the bond with redemption after eight years. Students gained credit for any parts of this evaluation that were carried out correctly.

Many candidates were able to calculate market weights correctly, although some chose to ignore the current bond market price and calculate a market price based on the present value of the conversion value. Credit was given where method was correct but calculation errors were made.

In Part (b) candidates who were not aware of the restrictions on the use of the WACC in investment appraisal tended to discuss how the WACC is calculated, or to suggest that WACC could be used if a company had debt in its capital structure. Credit could also have been gained here through discussing risk-adjusted discount rates and the link between project-specific discount rates and the WACC.

In part (c) weaker answers simply outlined the two models and their constituent variables. Better answers compared and contrasted the two models, and argued for the superiority of the CAPM.

		Marks	
(a)	Calculation of cost of equity	2	
	Calculation of cost of convertible debt	5	
	Calculation of cost of bank loan	1	
	Calculation of market values	2	
	Calculation of WACC	2	
			12
(b)	Discussion of business risk	2-3	
	Discussion of financial risk	1-2	
	Discussion of other relevant factors	1-2	
	Maximum		6
(c)	Discussion of dividend growth model	2-3	
	Discussion of capital asset pricing model	2-3	
	Conclusion	1-2	
	Maximum		7
			25

(a) **Cost of equity**

The required rate of return on equity can be found using the capital asset pricing model:

$E(r_i) = R_f + \beta_i (E(r_m) - R_f)$
$E(r_i) = 4.7\% + (1.2 \times 6.5\%)$
$\quad = \textbf{12.5\%}$

Cost of convertible debt

Conversion value $= P_0 (1 + g)^n R$

Where P_0 is the current share price
g is the expected annual growth of the share price
n is the number of years to conversion
R is the number of shares received on conversion

Conversion value $= \$5.50 \times (1 + 0.06)^6 \times 15$

$\quad = \$117.03$ per bond

We can therefore assume that **conversion will take place** as the conversion value is much greater than par value.

The **annual interest cost** net of tax will be $7\% \times (1 - 0.3) = \$4.90$ per bond

The cash flows will be as follows:

Year		Cash flow $m	10% discount factors	PV $m	5% discount factors	PV $m
0	Market value	(107.11)	1.000	(107.11)	1.000	(107.11)
1-6	Interest	4.90	4.355	21.34	5.076	24.87
6	Conversion value	117.03	0.564	66.00	0.746	87.30
				(19.77)		5.06

Calculate the cost of convertible debt using an IRR calculation.

$$\text{IRR} = a\% + \left[\frac{\text{NPV}_a}{\text{NPV}_a - \text{NPV}_b} \times (b - a) \right]\%$$

$$= 5\% + \frac{5.06(10\% - 5\%)}{5.06 + 19.77} = 6.02\%$$

The **after tax cost of convertible debt** is therefore **6.02%**

Cost of bank loan

After-tax interest rate $= 8\% \times (1 - 0.3)$
$= \mathbf{5.6\%}$

Market values

Market value of equity $= 20\text{m} \times \$5.50 = \$110\text{m}$

Market value of convertible debt $= 29\text{m} \times 107.11/100 = \$31.06\text{m}$

Market value of bank loan $= \$2\text{m}$

Total market value $= \$(110.00 + 31.06 + 2)\text{m} = \$143.06\text{m}$

Weighted average cost of capital

$$\text{WACC} = \left(\frac{V_E}{V_E + V_D} \right) k_e + \left(\frac{V_D}{V_E + V_D} \right) k_d$$

In this case, we have two costs of debt so:

$$\text{WACC} = \left(\frac{110}{143.06} \right) \times 12.5\% + \left(\frac{31.06}{143.06} \right) \times 6.02\% + \left(\frac{2}{143.06} \right) \times 5.6\%$$

$$= 9.61\% + 1.31\% + 0.08\%$$

$$= \mathbf{11\%}$$

(b)   The weighted average cost of capital is the **average** cost of the company's finance and represents the average return required as compensation for the **risks** of the investment.

Business risk

The WACC can only be used if the **business risk** of the proposed investment is similar to the business risk of existing operations. This would involve the **expansion of existing business**. If the proposed investment is in a different type of business, a **project-specific cost of capital** should be used which reflects the changing risk. The technique to use involves changing the beta in the capital asset pricing model.

Financial risk

The WACC can only be used where the **existing capital structure** will be maintained. This means that the finance for the project will be raised in the **same proportions** as the existing finance.

The finance that is raised to fund a new investment might substantially change the capital structure and the perceived **financial risk** of investing in the company. If this is the case, again a project-specific cost of capital can be calculated which reflects the changing financial risk.

Size of the project

The WACC can only be used if the project being appraised is **small** relative to the company. If the project is large in scale, it is more likely to cause a change in risk and make the WACC inappropriate.

(c)   **Dividend growth model**

There are a number of problems with the dividend growth model. It uses a set figure for g which assumes that **dividends grow smoothly**. In reality, dividends change according to decisions made by managers who

do not necessarily repeat historical trends. It is therefore very difficult to accurately predict the future dividend growth rate.

The other main problem is how to incorporate **risk**. The dividend growth model does not explicitly consider risk, particularly **business risk**. The company may change its area of business operations and the economic environment is notoriously uncertain. The **share price** will however fall as risk increases, leading to an increased cost of equity.

The model also ignores the effects of **taxation** and assumes there are **no issue costs** for new shares.

Capital asset pricing model

The main advantage that the CAPM has over the dividend valuation model is that it does **explicitly consider risk.** The CAPM is based on a comparison of the **systematic risk** of individual investments with the risks of all shares in the market. Systematic risk is risk that cannot be diversified away and an investor will require a **higher return** to compensate for higher risk. This higher return is the higher cost of equity that is calculated using the CAPM formula.

The formula does however require **estimates** to be made of **excess return**, the **risk-free rate** and **beta values**. All of these can be difficult to estimate, but are more reliable than the dividend growth rate used in the dividend valuation model.

Conclusion

The CAPM does explicitly consider risk and uses estimated values that are more reliable than those used in the dividend valuation model. It can therefore be said that CAPM offers the better estimate of the cost of equity of a company.

51 MC

> **Text references.** Business valuation is covered in Chapter 15 and equity issues in Chapter 12.
>
> **Top tips**. This question addresses a number of areas of knowledge, including share valuation, and the issues surrounding a stock market flotation. The answer is required in a report format, and you should map out an appropriate structure that will allow you to address all the key issues as succinctly as possible.
>
> Important points brought out by the discussion are when each method is useful and the **problems** with the figures used (for example balance sheets not including intangible assets, difficulties with figures of comparable companies).
>
> Note that the discussion in (b) focuses on the aims of shareholders and management. A conclusion, recommending a method and price, would be essential even if the question had not required it.
>
> **Easy marks**. Knowing the advantages and limitations of each valuation method always earns marks in business valuation questions.

Marking scheme

		Marks
(a)	3-4 marks for each method discussed. Max 10 for discussions not supported by calculations	16
(b)	Up to 2 marks for each advantage/disadvantage/point of comparison	6
(c)	Reasonable conclusions based on previous analysis	<u>3</u> <u>25</u>

To: Board of Directors, MC
From: Independent Consultant
Date: 31 December 20X0
Re: Valuation of MC

Introduction

This report deals with the alternative methods available for the valuation of the shares in the company. It also seeks to highlight some of the key issues to be addressed in arriving at an appropriate valuation for this type of company, and looks at the relative merits of public flotation versus an outright sale of the business.

(a)   **Company valuation**

There are three main valuation techniques that could be appropriate in this situation:

- Net assets basis
- Price/earnings ratio
- Dividend valuation model

These will be discussed in more detail below.

(i)   **Net assets basis**

The net asset value of MC is £60m or £6 per share.

This method is most commonly used to arrive at a **break-up value** for businesses with a significant amount of non-current assets. However, it is **less appropriate for service businesses**, and in particular for those in which the majority of the value is in the form of human and/or intellectual capital. In the latter type of company, a net assets valuation can be attempted if the intangibles are included as assets in the balance sheet. However, a significant part of the value of MC resides in its research division, and this is not reflected at all in the company's present balance sheet.

Although it could be argued that items such as brands should be included in the balance sheet so as to make the market more aware of the true value of the company, in reality it is extremely difficult both to **arrive** at and to **retain** an appropriate measure of these types of items.

A further argument against the incorporation of this type of intangible is that if the company is **publicly quoted**, and if the market shows **semi-strong or strong form efficiency**, then the market price of the shares should reflect this information in any case.

In view of these points, there is little point in attempting a net assets valuation for MC at the present time. The inappropriateness of this can be illustrated with reference to the competitor, which would have a theoretical net assets based valuation of £75m as compared with a market capitalisation of £196m (£9.80 share price × 20m shares in issue).

(ii)   **Price/earnings ratio**

This method **compares the earnings information** of the company with that of other **companies of similar size** and characteristics that operate in the same markets, to arrive at an appropriate market price for the shares. The information that has been provided for the quoted competitor will be used to arrive at an initial price, but this will need to be adjusted to reflect the fact that the competitor lacks MC's research capability.

The **price/earnings (P/E) ratio** is calculated by **dividing the market price of the shares** by the **earnings per share**. The competitor has a P/E ratio of 16.3 (980p/60p). Although this is likely to be above the average for quoted industrial companies as a whole, it does not appear to be unreasonably high for the medical sector. Given that MC is forecasting better growth prospects than the competitor, and also has a research capability, it seems reasonable to value the company on a P/E of around 18 times. This would value MC at £135m (18 × 75p × 10m shares in issue).

However, if the shares were to be offered on the open market, it would be prudent to price them at a **discount** to this to reflect the fact that the company would be a new entrant to the stock market, despite an eleven year trading history. Pricing at a discount will also make the issue more attractive to investors and thereby help to obtain a good take-up of shares.

Valuation on a P/E of 18 implies a price of £13.50 per share. If the shares were to be offered at a discount of, say, 15%, this would result in an offer price of around £11.50 per share, and a market capitalisation of £115m.

(iii) **Dividend valuation model**

The dividend valuation model has the central assumption that the **market value** of shares is **directly related** to the **expected future dividends** on those shares. It can be expressed as:

$$P_0 = \frac{d_0(1+g)}{(k_e - g)}$$

Since the shares are not yet quoted, it is **not possible to say** exactly what the **shareholders' net cost of capital** is likely to be. However, it might be reasonable to use the competitor's cost of equity of 13% for an initial estimate. This is better than using the 'rule of thumb' discount rate of 15%, as MC has a lower financial risk than the competitor (the debt ratio is much lower) and a higher dividend per share and growth rate.

This cost of equity can now be used in the dividend valuation model to estimate the market value of MC:

$$P_0 = \frac{d_0(1+g)}{(k_e - g)}$$

$$P_0 = \frac{(55p \times 10m) \times (1 + 8\%)}{(13\% - 8\%)}$$

$$P_0 = £118.8m$$

The dividend valuation model values the company at £118.8m, or £11.88 per share. This assumes a growth rate of 8%. However, in reality, the **potential growth** rate may be **higher** since the company is currently evaluating investments at a discount rate that is above the estimated cost of capital. This means that it may be turning down investments that would in fact add value to the company and hence result in higher dividends and a higher growth rate.

(b) **The relative advantages of flotation and direct sale**

The following points should be considered when deciding which option is to be preferred.

(i) **Aims of existing owners**

The **aims of the existing owners** are important in determining the best course of action. If a significant number of the existing consortium wish to **maintain control** over the business in the future, then they are more likely to be able to achieve this if the company is floated rather than sold.

(ii) **Market for shares**

Flotation will create a **wider market** for the **company's shares**. This has the twin benefits that it will be **easier** for the company to **raise additional capital** to finance expansion, and that the existing shareholders will be able to realise all or part of their holding. However, if MC is to achieve a good price, the existing owners should aim to retain the major part of their holding for a reasonable period following the flotation.

(iii) **Share option schemes**

Flotation will allow the company to offer **share option schemes** to its employees, which should **assist** in the **recruitment** and **retention of good staff**. This is particularly important in a company such as MC, where a significant part of the value in the company is linked to the knowledge base and research capability. Retaining a high proportion of the key staff will be vital to the success of any change in ownership, and must be taken into account in the structuring of either the sale or the flotation.

(iv) **Costs of flotation**

Flotation will be an **expensive process** and will mean that the company has to comply with the stringent Stock Exchange regulations. It will put extra administrative burdens on the management and will cost more to organise than would a direct sale of the business.

(c) **Conclusions and recommendations**

(i) **Sale price**

The calculations suggest that the company should achieve a **sale price** of at least £120m. This compares with a **market capitalisation** of the **competitor** of £196m. Since MC has better growth prospects and also has a research base, which the competitor lacks, it may be able to achieve a better price than this, but £120m should be regarded as the base price in any negotiations.

(ii) **Stock market quotation**

It is also recommended that the company should opt for a **Stock Market quotation** rather than for a direct sale. Given the current state of the market for this type of stock, it should be able to achieve a good price, and flotation will also give flexibility to the owners in allowing them to realise a part of their investment, while at the same time retaining control over the future direction of the business.

52 BST

> **Text references.** Business valuation is covered in Chapter 17 and market efficiency in Chapter 18.
>
> **Top tips.** In (a), you are not told what methods to use so you have to identify relevant information. You are given the net assets value, given all the information for the price-earnings, market capitalisation calculation, and given an indication of future growth that you can use in the dividend valuation model calculation.
>
> Key factors in (b) are quality of forecasts, assets being purchased, effect on dividend policy and post-acquisition savings.
>
> Part (c) is a straightforward discussion of factors affecting share prices.

(a) **Methods of valuation and range of values for SM**

Net assets

The book value of SM's **net assets attributable to equity shareholders** is $45 million. This figure may need to be adjusted for **increased or decreased market values** of assets, particularly SM's property holding. However in any case, for a going concern, the book value of assets is a poor indicator of their economic value, which depends on their **income-generating capacity,** rather than their historical cost or realisable value. Here also SM has a **franchise** generating earnings that will not be reflected in the balance sheet.

Price/earnings model

SM's existing earnings per share is $1.53, and number of shares is 1.5 million, giving total equity earnings of $2.295 million. Taking the 5% growth figure given, next year's earnings would be $**2.410 million.** However, the managing director is estimating $4 million for next year. This figure cannot be accepted at face value and would need to be substantiated.

In the absence of any better information, BST's P/E ratio could be applied to these earnings figures. This is 1237/112.5 = 10.996, say 11.

The range of values for SM's valuation would be between $2.410 million × 11 and $4 million × 11 ie between **$26.5 million and $44 million.**

This valuation is dependent upon the **P/E ratio.** Arguably a lower ratio should be used as SM is unquoted, but it is difficult to say how much lower. Also BST's ratio may not be typical of the industry.

Dividend valuation model

Again there is a range of values depending on whether the MD's forecast earnings are believed.

Last year's total dividends were 1.5m × 100 cents = $1.5 m. A 5% increase next year would give $1.575 million. The cost of equity for similar firms is 10% and the expected growth rate 5%.

So on this basis the expected company value = $1.575m/(0.1 − 0.05) = **$31.5 million**.

SM 's dividend payout ratio (dividend/earnings) is 100 /153 = 0.654.

Based on the MD's forecast earnings of $4 million, next year's dividend would be $4m × 0.654 = **$2.616 million.**

The forecast company value would be $2.616 million/(0.1 − 0.05) = $52.3 million.

The **drawbacks** of this method are:

(i) The assumption that SM's **cost of equity** is the **same as similar firms** may be misleading.

(ii) The **assumption of constant dividend growth** at that rate may be **misleading.** Dividend policy may change on takeover.

(iii) Share price is **not normally** just **a function of dividend policy;** future expected earnings are also a key factor.

Summary

Based on valuation of assets and income earning capacity, SM appears to have a value **anywhere between $25 million and $£52 million**. The higher earnings-based figures are heavily dependent on the MD's forecast of next year's earnings that may well be overstated. Because the net asset value is towards the top end of the valuation range, BST could probably look at a value of between **$40 million and $45 million,** but will need to carry out further investigations on likely asset values.

(b) **Financial factors that may affect the bid**

Financial factors relating to BST

(i) Like SM, the **forecast of next year's earnings** may be **overstated.** Current earnings = $1.125 × 25 million = $28.125 million. 4% growth (given) gives $29.25 million, but BST's forecast for next year is $35 million.

(ii) The **total market value of the company's shares** is **below the net asset value**.25m shares × $12.37 = $309.25.m that is below the $350m net asset value. This may indicate that the company possesses **under-utilised assets**, or alternatively that its assets are overstated in value. On the face of it, the company would be better broken up than operating as a going concern. All these factors will be of interest to any of SM's shareholders who would be considering receiving BST shares. It will also interest the market and BST's low market value may mean that it becomes a takeover target itself.

(iii) BST has a fairly **high gearing ratio.** If BST lacks cash and has to borrow more in order to buy out those 50%+ shareholders of SM who do not wish to have BST shares, this may have the effect of increasing the company's cost of capital.

(iv) BST has a **lower dividend payout ratio** than SM. This may discourage some of SM's shareholders from accepting BST's shares.

(v) **Strategically** it is **unclear** why BST is buying SM; whilst BST may be trying to diversify, SM may not be a big enough acquisition to make it worth diversifying. There may be better investment opportunities.

Relevant financial factors relating to SM

(i) Next year's **forecast earnings** may be **overstated.** However, some of the directors may be taking **higher salaries** than **realistic market levels,** and the ongoing future profitability of the company may be higher if these people are replaced with lower cost managers.

(ii) Like BST, **asset value** is **high.** The net asset valuation is in fact higher than some of the other valuations, and SM's shareholders are unlikely to accept an offer below net asset value.

(iii) The company is **ungeared,** which is advantageous, as it enables BST to borrow to fund part of the acquisition.

(iv) The **'quality' of SM's earnings** is probably **higher** than BST's, as it operates in up-market areas.

(v)   Selling SM to a listed company represents a good way for SM's shareholders to **realise the value of their investment**. However, many of the shareholders are likely to lose their jobs and may find it difficult to find equivalent positions. The bid may therefore be opposed by a substantial number of shareholders.

(vi)   There are likely to be many areas where **costs can be saved** as a result of the acquisition of SM. This may make it worthwhile for BST to pay a higher price for SM.

(vii)   BST is likely to have **good access to SM's business documentation** as SM has contacted BST. This should enable BST to calculate a more accurate valuation.

(c)   The **fundamental theory of share values** states that the realistic market price of a share can be derived from a valuation of estimated future dividends. The value of a share will be the discounted present value of all future expected dividends on the shares, discounted at the shareholders' cost of capital.

If the fundamental analysis theory of share values is correct, the price of any share will be **predictable**, provided that all investors have the same information about a company's expected future profits and dividends, and a known cost of capital.

However, share prices are also affected by a number of other factors.

Marketability and liquidity of shares

In financial markets, **liquidity** is the **ease of dealing** in the shares, how easily can the shares can be bought and sold without significantly moving the price?

In general, large companies, with hundreds of millions of shares in issue, and high numbers of shares changing hands every day, have good liquidity. In contrast, small companies with few shares in issue and thin trading volumes, can have very poor liquidity.

The **marketability** of shares in a private company, particularly a minority shareholding, is generally very limited, a consequence being that the price can be difficult to determine.

Shares with restricted marketability may be subject to sudden and large falls in value and companies may act to improve the marketability of their shares with a **stock split**. A stock split occurs where, for example, each ordinary share of $1 each is split into two shares of 50c each, thus creating cheaper shares with **greater marketability**. There is possibly an added psychological advantage, in that investors may expect a company which splits its shares in this way to be planning for substantial earnings growth and dividend growth in the future.

As a consequence, the market price of shares may benefit. For example, if one existing share of $1 has a market value of $6, and is then split into two shares of 50c each, the market value of the new shares might settle at, say, $3.10 instead of the expected $3, in anticipation of strong future growth in earnings and dividends.

Availability and sources of information

An efficient market is one where the prices of securities bought and sold reflect all the **relevant information** available. Efficiency relates to how quickly and how accurately prices adjust to new information. Information comes from financial statements, financial databases, the financial press and the internet.

It has been argued that shareholders see **dividend decisions** as passing on **new information** about the company and its prospects. A dividend increase is usually seen by markets to be good news and a dividend decrease to be bad news, but it may be that the market will react to the difference between the actual dividend payments and the market's **expectations** of the level of dividend. For example, the market may be expecting a cut in dividend but if the actual decrease is less than expected, the share price may rise.

Market imperfections and pricing anomalies

Various types of anomaly appear to support the views that irrationality often drives the stock market, including the following.

- **Seasonal month-of-the-year effects**, day-of-the-week effects and also hour-of-the-day effects seem to occur, so that share prices might tend to rise or fall at a particular time of the year, week or day.

- There may be a **short-run overreaction** to recent events. For example, the stock market crash in 1987 when the market went into a free fall, losing 20% in a few hours.
- Individual shares or shares in small companies may be neglected.

Market capitalisation

The market capitalisation or **size** of a company has also produced some pricing anomalies.

The return from investing in **smaller** companies has been shown to be **greater** than the average return from all companies in the long run. This increased return may compensate for the greater risk associated with smaller companies, or it may be due to a start from a lower base.

Investor speculation

Speculation by investors and market sentiment is a major factor in the behaviour of share prices. **Behavioural finance** is an alternative view to the efficient market hypothesis. It attempts to explain the market implications of the **psychological** factors behind investor decisions and suggests that **irrational investor behaviour** may significantly affect share price movements. These factors may explain why share prices appear sometimes to over-react to past price changes.

53 Phobis Co

Text references. Business valuations are covered in Chapter 17, convertible bonds in Chapter 12 and market efficiency in Chapter 18.

Top tips. In part (a) don't forget to discuss the values you calculate or you will lose 4 valuable marks.

You will probably have found the calculations in part (b) trickier. If you could not remember the formula for the calculation of the conversion value, you could have worked it out using a logical approach. You may also have been confused by the term 'floor value' but this simply means the value of the bond if it is not converted. The most important aspect of this is to not panic and don't spend too long on any one part of a question. If you get stuck, move on!

Easy marks. The calculations in part (a) are very straightforward if you have practised these valuation calculations. The discussion in part (c) should be easy if you have learnt the material on the efficient market hypothesis.

Examiner's comments. Answers to part (a) often failed to gain many marks, mainly because candidates did not calculate company values.

A number of candidates were unable to distinguish between some of the variables given in the question, for example confusing dividend per share with earnings per share, return on the market with cost of equity, and equity beta with retention ratio.

Even though the current market value of the company (number of shares multiplied by share price) was needed, a number of candidates failed to calculate it. The level of discussion was often limited, although some candidates demonstrated that they were aware of the weaknesses of the valuation models used.

Many candidates either failed to answer part (b), or showed in their answers that they did not understand how to calculate the present value of a stream of future cash flows (which is what the market value of a bond is equivalent to).

A number of candidates were not aware of the difference between interest rate, cost of debt and share price growth rate and used their values interchangeably. Some candidates introduced an assumed tax rate, when the question made no reference to taxation at all. There were indications of candidates learning a computation method, without acquiring an understanding of the concepts underlying it. Candidates must understand the importance, in financial management, of discounting future values in order to obtain present values, since this is used in investment appraisal, bond valuation, share valuation and company valuation.

A number of candidates did not understand and could not discuss market efficiency, in part (c) and very few correctly discussed the significance of semi-strong market efficiency to a company. Overall, many answers to this question were not of a pass standard.

		Marks
(a)	Price/earnings ratio value of company	2
	Proposed dividend per share	1
	Average dividend growth rate	1
	Cost of equity using CAPM	1
	Dividend growth model value of company	2
	Discussion	4
		11
(b)	Conversion value	1
	Market value	2
	Floor value	2
	Conversion premium	1
		6
(c)	Weak form efficiency	1–2
	Semi-strong form efficiency	1–2
	Strong form efficiency	1–2
	Significance of semi-strong form efficiency	2–3
	Maximum	8
		25

(a) (i) **Price/earnings ratio method of valuation**

Market value = P/E ratio × EPS

EPS = 40.0c

Average sector P/E ratio = 10

Value of shares = 40.0 × 10 = $4.00 per share

Number of shares = 5 million

Value of Danoca Co = **$20 million**

(ii) **Dividend growth model method of valuation**

$$P_o = \frac{D_o(1+g)}{K_e - g}.$$

Note: The formula sheet in this exam uses r_e instead of k_e

D_0 can be found using the proposed payout ratio of 60%.

D_0 = 60% × 40c = 24c

$$(1 + g)^2 = \frac{\text{Proposed dividend}}{\text{Dividend two years ago}}$$

$$(1 + g)^2 = \frac{24.0}{22.0}$$

$$1 + g = \sqrt[2]{1.091} = 1.045$$

$$g = 4.5\%$$

$$k_e = r_e = E(r_i) = R_f + \beta_i(E(r_m) - R_f)$$

$$= 4.6 + (1.4 \times (10.6 - 4.6))$$

$$= 4.6 + (1.4 \times 6)$$

$$= 13\%$$

Value of shares $= \dfrac{0.24 \times (1 + 0.045)}{0.13 - 0.045}$

$$= \$2.95$$

Value of Danoca Co = **$14.75 million**

Discussion of the values calculated

P/E ratio

The current share price of Danoca is $3.30 which equates to a P/E ratio of 8.25 (3.30/0.4). This is **lower** than the average sector P/E ratio of 10 which suggests that the market does not view the **growth prospects** of Danoca as favourably as an average company in that business sector.

This implies that an acquisition by Phobis could result in **improved financial performance** of Danoca, assuming that Phobis has the competences and skills to transfer to Danoca.

Dividend growth

The dividend growth model method of valuation resulted in a value of $14.75m which is **lower** than the current market capitalisation of Danoca of $16.5m ($3.30 × 5m). The current share price may be artificially high due to bid rumours but shareholders are unlikely to accept a valuation much lower than this.

The dividend growth model uses an estimated expected growth rate and a calculated cost of equity, both of which are **subject to error.**

The model assumes that **investors act rationally and homogenously** and this may not be true. Shareholders may have different expectations and the stock market may not be completely efficient, both of which will make this method of valuation less reliable.

(b) (i) **Dividend growth model method of valuation**

Conversion value $= P_0(1 + g)^n R$

where P_0 = current ex-dividend ordinary share price = 4.45

g = expected annual growth of the ordinary share price = 6.5%

n = number of years to conversion = 5

R = number of shares received on conversion = 20

Conversion value $\quad = 4.45 \times (1 + 0.065)^5 \times 20$

$$= \$122$$

The conversion value is **higher** than the redemption value of $100 so **conversion is expected**.

The current market value is the sum of the present value of the future interest payments and the present value of the bond's conversion value.

Present value of $9 interest per annum for five years at 7% = 9 × 4.100 = $36.90

Present value of the conversion value = 122.00 × 0.713 = $86.99

Current market value of convertible bond = 36.90 + 86.99 = **$123.89**

    (ii) **Floor value**

The floor value is the sum of the present value of the future interest payments and the present value of the redemption value.

Present value of $9 interest per annum for five years at 7% = 9 × 4.100 = $36.90

Present value of the redemption value = 100.00 × 0.713 = $71.30

Floor value of convertible bond = 36.90 + 71.30 = **$108.20**

    (iii) **Conversion premium**

Conversion premium = current market value – current conversion value

Current conversion value = $4.45 × 20 = $89.00

Current market value = $123.89

Conversion premium = 123.89 – 89.00 = **$34.89**

As an amount per share = 34.89/20 = **$1.75**

(c)   Stock market efficiency

If a stock market is efficient, share prices should vary in a **rational way** and will reflect the **amount of relevant information** that is available. The **efficient market hypothesis** identifies three forms of efficiency; weak, semi-strong and strong.

Weak form efficiency

Under the weak form hypothesis of market efficiency, share prices reflect all available information about **past** changes in the share price.

Since new information arrives unexpectedly, changes in share prices should occur in a **random fashion.** If it is correct, then using technical analysis to study past share price movements will not give anyone an advantage, because the information they use to predict share prices is already reflected in the share price.

Semi-strong form efficiency

If a stock market displays semi-strong efficiency, current share prices reflect both:

- **All relevant information** about **past price movements** and their implications, and
- All **knowledge** which is **available publicly**

This means that individuals cannot 'beat the market' by reading the newspapers or annual reports, since the information contained in these will be reflected in the share price.

Stock markets are usually presumed to be semi-strong efficient.

Strong form efficiency

If a stock market displays a strong form of efficiency, share prices reflect **all** information whether publicly available or not:

- From past price changes
- From public knowledge or anticipation
- From specialists' or experts' insider knowledge (eg investment managers)

Significance to a listed company of semi-strong efficiency

The main consequence for financial managers will be that they simply need to **concentrate** on **maximising the net present value** of the **company's investments** in order to maximise the wealth of shareholders. Managers need not worry, for example, about the effect on share prices of financial results in the published accounts because investors will make **allowances** for **low profits** or **dividends** in the current year if higher profits or dividends are expected in the future.

There is little point in financial managers attempting strategies that will attempt to mislead the markets. There is no point for example in trying to identify a correct date when **shares** should be **issued**, since share prices will always reflect the true worth of the company.

The market will identify any attempts to **window dress the accounts** and put an optimistic spin on the figures.

54 THP Co

Text references. Business valuations are covered in Chapter 17 and rights issues in Chapter 12.

Top tips. This question has a quite complicated scenario that you need to read very carefully. There are linkages between the requirements so, if you can't answer one part, make an assumption and use your own figure in the next part.

Easy marks. Three easy marks are available at the start for application of the dividend valuation model to value a company. There are also straightforward marks available for the calculations in parts (b) and (c).

Examiner's comments. The first step in part (a) was to calculate the current dividend per share, which surprisingly many candidates found difficult. Only one calculation, multiplying the earnings per share of the company by its payout ratio, was needed, but some candidates used half a page of calculations to produce the same answer. This highlights the importance of being familiar with the accounting ratios included in the F9 syllabus. Candidates then needed to use the formula for the DGM given in the formula sheet. Candidates must be familiar with the formulae provided in the examination paper. Some candidates did not understand 'market capitalisation' and offered no answer here for what was a straightforward calculation.

A significant number of candidates showed that they were unfamiliar with the part of the syllabus examined in part (b) and gave answers that gained little credit. Some answers ignored the share price they had calculated in part (a) and assumed a different market price prior to the rights issue, frequently the company's ordinary share par value. Candidates should be aware that rights issues will not be made at a discount to par value. Many 'own error' marks were awarded in marking this part of the question, following on from an assumed share price. In calculating market capitalisation after the rights issue, many answers neglected to subtract the issue costs.

Answers to part (c) were often incomplete or adopted an incorrect methodology, for example calculating the price/earnings ratio of the target company when the question did not give the information needed for this.

In part (d) many candidates did not offer any calculations to support their discussion, or offered calculations that did not relate to the question asked.

In part (e) good answers focused on the circumstances of the company, considered its current capital structure, and discussed such factors as financial risk, current and expected interest rates, security and servicing costs, while weak answers offered a brief list of points with no discussion.

			Marks
(a)	Dividend per share	1	
	Ex-dividend share price	2	
	Market capitalisation	1	
			4
(b)	Rights issue price	1	
	Cash raised	1	
	Theoretical ex-rights price per share	1	
	Market capitalisation	2	
			5
(c)	Calculation of price/earnings ratio	1	
	Price/earnings ratio valuation	2	
			3
(d)	Calculations of market capitalisation	2-3	
	Comment	3-4	
	Maximum		5
(e)	Relevant discussion	6-7	
	Links to scenario in question	2-3	
	Maximum		8
			25

(a) $$p_0 = \frac{d_0(1+g)}{k_e - g}$$

$d_0 = 64c \times 50\% = 32c$ per share

$g = 5\%$

$k_e = 12\%$

Share price = $\dfrac{0.32(1+0.05)}{(0.12 - 0.05)}$ = **\$4.80**

Market capitalisation = \$4.80 × 3m shares = **\$14.4m**

(b) (i) **Rights issue price per share** = \$4.80 × (1 − 20%) = **\$3.84**

(ii) It is a 1 for 3 rights issue so number of new shares = 3m/3 = 1m

Cash raised = 1m × \$3.84 = **\$3.84m**

(iii) **Theoretical ex-rights price** = ((3 × \$4.80) +\$3.84)/4 = **\$4.56**

(iv) **Market capitalisation**

	\$m
Market capitalisation from part (a)	14.4
Cash raised from rights issue	3.84
Issue costs	(0.32)
	17.92

The market capitalisation of THP Co after the rights issue is **\$17.92m**, and the share price is \$17.92/4 = \$4.48

(c) P/E ratio of THP Co = Share price/earnings per share

= 480/64

= 7.5

Earnings per share of CRX Co = 44.8c

Using the P/E ratio of THP Co:

Share price of CRX Co = 0.448 × 7.5 = **$3.36**

Market capitalisation = $3.36 × 1m shares = **$3.36m**

(d)   (i)   **No announcement**

In a semi-strong efficient capital market, current share process reflect all relevant information about **past price movements** and all knowledge which is **available publicly**. If the announcement is not made, the information in the expected savings will not be reflected in the share price of THP Co.

The market capitalisation of THP Co after the acquisition will therefore be equal to its value after the rights issue plus the market capitalisation of CRX Co less cash paid to buy CRX Co.

This amounts to:

$14.4m (from part a) + $3.36m (from part c) = $17.76m

= **$17.76m**

This is equivalent to a **share price** of **$4.44** (17.76/4). The market capitalisation has **fallen** as, without the information on additional earnings, THP Co has apparently paid $3.52m for a company that is only worth $3.36m.

(ii)   **An announcement is made**

In a semi-strong form efficient capital market, the information will be **reflected quickly** and **accurately** in the share price of THP Co.

The value of the business should increase by the present value of the annual after-tax savings. A quick way to calculate this is to multiply the additional earnings by the P/E ratio:

$96,000 x 7.5 = $0.72m

This gives a **revised market capitalisation** of **$18.48m** (17.76 + 0.72) which is equivalent to a **share price** of **$4.62** (18.48/4).

This makes the acquisition much more attractive to the shareholders of THP Co as their shareholder wealth has increased. The **capital gain** on the shares is 14c per share (4.62 – 4.48).

This does however assume that the market has not already **anticipated** the savings before they are actually announced.

(e)   There are a number of factors to be considered in the choice between debt and equity finance.

Gearing and financial risk

Debt finance tends to be relatively **low risk** for the debtholder as it is interest-bearing and can be secured. The **cost of debt** to a company is therefore relatively **low**. The greater the proportion of debt, the more **financial risk** to the shareholders of the company so the **higher** is their required return.

Financial risk can be measured by the **gearing ratio**. For THP, gearing is currently 68.5% (5,000/7,300 x 100). If **equity finance** is used, this will **decrease** to 45% (5,000/(7,300 + 3,840) x 100%). If debt finance is used, gearing will **increase** to 121% ((5,000 + 3,840)/7,300 x 100).

The relative acceptability of these levels of gearing depends on THP's desired level of financial risk.

Objectives

If the primary financial objective of THP Co is to **maximise shareholder wealth**, it should aim to minimise its WACC. This can be achieved by **increasing the amount of debt** in its capital structure. The limit to this is the point at which gearing is so high that costs of **financial distress** are incurred. For example, bankruptcy risk and restrictive covenants imposed by debt providers.

Security

The choice of finance may be determined by the assets the business is willing or able to offer as **security**. This can be in the form of a **fixed charge** on specific assets, or a **floating charge** on a class of assets. More information would be needed on the availability of such assets.

Investors are likely to expect a **higher return** on unsecured debt to compensate them for the extra risk.

Expectations

If **economic conditions** are buoyant, THP Co will be more willing to take on extra debt and commitment to pay interest than if business is suffering in an economic downturn. Lenders are also likely to be more cautious and less willing to lend if the economy is struggling.

Control

A key **advantage of debt finance** for a company's shareholders is that existing shareholdings will not be **diluted**. Debt providers may however impose covenants restricting dividend payment.

A **rights issue** will also not dilute existing patterns of ownership and control provided existing shareholders take up their rights. If the amount of new equity finance required is sufficiently large, new shares may be issued to **new** investors, for example in a **placing**, and this will dilute existing shareholdings.

55 Dartig Co

Text references. Rights issues are covered in Chapter 12, business valuation in Chapter 17 and the agency problem in Chapter 1.

Top tips. You need to recognise the need to calculate the growth rate of dividends in this question which you can then use in part (b) and part (d). If this is too tricky, state a suitable figure and carry on with the calculations. Make sure you write suitably detailed points in the discussion parts and don't just focus on the calculations.

Easy marks. There are easy marks available for the calculations in parts (a) and (d). Good knowledge of the early part of the syllabus will enable you to gain easy marks for the explanations in part (e).

Examiner's comments. In part (a) many candidates gained full marks for their calculations. Weaker answers made errors as regards the form of the issue (it was 1 for 4, not 4 for 1), or thought the theoretical ex rights price was the rights issue price, or calculated the value of the rights. In part (b) a number of candidates were not able to calculate the price/earnings ratio by dividing the current share price by the current EPS. Calculating the EPS after the expansion by multiplying the current EPS by the average historic EPS growth rate was also a problem for some candidates, who were unable to calculate average historic growth rate, or who applied the growth rate to the average EPS rather than the current EPS. Some students were also unfamiliar with the PER valuation method, even though this is discussed in the study texts.

Better answers in part (c) looked to compare the theoretical rights price per share (the share price before the rights issue funds were invested) with the share price after the investment had taken place (for example the share price calculated in part (b)), or to compare the return from the investment (for example, total shareholder return, which is the sum of capital gain and divided yield) with the cost of equity.

Many candidates gained full marks in part (d). Marks were lost where candidates used EPS rather than dividend per share in the dividend growth model, or were not able to calculate the dividend growth rate, or used incorrect values in the dividend growth model. A surprising number of candidates did not use the dividend growth model given in the formula sheet, but used the rearranged version of the formula that is used to calculate the cost of equity. Some candidates mistakenly thought that the cost of equity calculated by this formula was the same as the share price.

			Marks
(a)	Rights issue price	1	
	Theoretical ex-rights price per share	<u>2</u>	
			3
(b)	Existing P/E ratio	1	
	Revised EPS	1	
	Share price using P/E method	<u>1</u>	
			3
(c)	Discussion of share price comparisons	3-4	
	Calculation of capital gain and comment	<u>1-2</u>	
		Maximum	5
(d)	Average dividend growth rate	2	
	Ex-div market price per share	2	
	Discussion	<u>2</u>	
			6
(e)	Discussion of agency problem	4-5	
	Discussion of share option schemes	<u>4-5</u>	
		Maximum	<u>8</u>
			<u><u>25</u></u>

(a) (i) Rights issue price = $2.50 × 80% = $2.00 per share

Theoretical ex-rights price

	$
4 shares @ $2.50	10.00
<u>1</u> share @ $2.00	<u>2.00</u>
<u>5</u>	<u><u>12.00</u></u>

Theoretical ex-rights price (TERP) = 12.00/5 = **$2.40**

(b) Average growth rate of earnings per share:

$$1 + g = \sqrt[4]{\frac{32.4}{27.7}}$$

1 + g = 1.03996

g = 4%

EPS following expansion = 32.4 × 1·04 = 33.7 cents per share

Current P/E ratio = 250/32.4 = 7·7 times

Share price following expansion = $0.337×7.7 = **$2.60**

(c) A company will only be able to raise finance if investors think the **returns** they can expect are satisfactory in view of the **risks** they are taking. The proposed business expansion will be an acceptable use of the rights issue funds if it **increases shareholder wealth**.

This can be measured by looking at the effect on the **share price.** The current share price is $2.50 and the future share price predicted by the P/E method is $2.60. This indicates that shareholder wealth would increase. However, the capital gain is actually larger than this as shareholders will obtain new shares at a discount, resulting in a theoretical ex-rights price of $2.40. The **capital gain for shareholders** is therefore $2.60 – $2.40 = 20 cents per share.

Alternatively, we can consider the effect on **total shareholder wealth**. The rights issue involves 2.5 million shares ($5m/$2 per share). There were therefore 10 million shares (2.5 × 4) before the investment and

Dartig was worth $25m (10m × $2.50). After the investment, Dartig is worth $27.5m (12.5m × $2.60 − $5m) which is a **capital gain** of $2.5m.

If investors believe that the expansion will enable the business to grow even further, the capital gain could be even greater. If however, investors do not share the company's confidence in the future, the share price could fall.

(d) **Dividend growth model method of valuation**

$$P_0 = \frac{D_0(1+g)}{r_e - g}$$

Cost of equity (r_e) = 10%

$$g = \sqrt[4]{\frac{15.0}{12.8}} = 4\%$$

Alternative approach

Using the Gordon growth model $g = br_e$

Average payout ratio over the last 4 years has been 47%, so the average retention ratio has been 53%.

$g = 53\% \times 10\% = 5\cdot3\%$

$D_0 = \$0.15$

$$P_0 = \frac{0.15\,(1+0.04)}{0.1-0.04}$$

$$= \$2.60$$

This is 10 cents per share more than the current share price of Dartig Co.

Reasons for difference in share price

The dividend growth model assumes that the **historical trend** of dividend per share payments will **continue into the future**. The future dividend growth rate may however differ from the average historical dividend growth rate, and the current share price may incorporate a more conservative estimate of the future dividend growth rate.

The **cost of equity** of Dartig Co may not be 10%. It may be difficult to make a confident estimate of the cost of capital.

The dividend valuation model assumes that investors act **rationally** and **homogenously**. In reality, different shareholders will have different expectations and there may be a degree of **inefficiency** in the capital market on which the shares of Dartig Co are traded.

(e) **The agency problem**

Although ordinary shareholders are the owners of the company to whom the board of directors are accountable, the actual powers of shareholders tend to be restricted, except in companies where the shareholders are also the directors. The **day-to-day** running of a company is the responsibility of **management.**

Shareholders are often ignorant about their company's current situation and future prospects. They have no right to inspect the books of account, and their forecasts of future prospects are gleaned from the annual report and accounts, stockbrokers, investment journals and daily newspapers. The relationship between management and shareholders is sometimes referred to as an **agency relationship**, in which managers act as agents for the shareholders.

The **agency problem** refers to the fact that the managers of a company may act in ways which do not lead to shareholder wealth maximisation. There is a **divorce of ownership from control**. If managers hold none or very little of the equity shares of the company they work for, what is to stop them from working inefficiently,

not bothering to look for profitable new investment opportunities, or giving themselves high salaries and perks?

Share option schemes

Goal congruence may be better achieved and the agency problem better dealt with by offering organisational **rewards** (more pay and promotion) for the achievement of certain levels of performance.

In a **share option scheme**, selected employees are given a number of share options, each of which gives the holder the right after a certain date to subscribe for shares in the company at a fixed price. The value of an option will increase if the company is successful and its share price goes up.

Schemes based on shares can **motivate managers** to act in the long-term interests of the organisation by doing things to increase the organisation's market value, for example by investing in projects with positive net present values.

However, it is possible that managers may be rewarded for poor performance if **share prices in general** are rising. An opposite effect would occur if share prices in general are falling and managers may not be rewarded for good performance.

A further problem is deciding on a **share option exercise price** and a **share option exercise date** that will spur managers to concentrate on increasing shareholder wealth and be demanding, rather than being easily achievable.

56 KFP Co

> **Text references**. Cost of capital is covered in Chapter 15, business valuation in Chapter 17 and the capital structure decision in Chapter 16.
>
> **Top tips.** This is a wide ranging question and you must ensure that you answer the specific requirements of each question.
>
> Make sure you use the CAPM formula to calculate the cost of equity and the IRR formula to calculate the cost of debt in part (a). In part (b) you need to assume that the dividend growth rate is the same as the earnings per share growth rate given in the question.
>
> Part (c) is asking for a discussion of optimal capital structure theory, not the use of WACC in investment appraisal. You need to calculate the current gearing of the bidding company and consider the effect of adding more debt equal to the value of the target company. We have used book values in this calculation, but you could have used market values.
>
> **Easy marks.** There are easy marks available for the calculations, especially in part (a) which should be very straightforward if you have practised this technique.
>
> **Examiner's comments.** In part (a) many candidates gained full marks but some answers lost marks because they included the debt of the target company in their calculation.
>
> Many candidates had difficulty in calculating the dividend per share in part (b). This indicates a lack of understanding of the payout ratio.
>
> Some answers in part (c) failed to answer the question or were very general in nature.
>
> **ACCA examiner's answer**. The examiner's answer to this question is included at the back of this kit.

			Marks
(a)	Cost of equity calculation	2	
	Correct use of taxation rate	1	
	Cost of debt calculation	3	
	Market value of equity	1	
	Market value of debt	1	
	WACC calculation	2	
			10
(b)	Price/earnings ratio value of company	2	
	Current dividend per share	1	
	Dividend growth model value of company	3	
			6
(c)	Traditional view of capital structure	1-2	
	Miller and Modigliani and capital structure	2-3	
	Market imperfections	1-2	
	Other relevant discussion	1-2	
	Comment on debt finance for cash offer	2-3	
		Maximum	9
			25

(a) **Cost of equity**

Using the CAPM: $E(r_i) = R_f + \beta_i (E(r_m) - R_f)$

$E(r_i)$ = 4% + 1.2(10.5% − 4%)
        = 11.8%

Cost of debt

After-tax interest payment = 100 × 7% × (1 − 30%) = $4.90

Year		Cash flow $m	10% discount factors	PV $m	5% discount factors	PV $m
0	Market value	(94.74)	1.000	(94.74)	1.000	(94.74)
1-7	Interest	4.90	4.868	23.85	5.786	28.35
7	Capital repayment	100.00	0.513	51.30	0.711	71.10
				(19.59)		4.71

Calculate the cost of debt using an IRR calculation.

$$IRR = a\% + \left[\frac{NPV_a}{NPV_a - NPV_b} \times (b - a) \right]\%$$

$$= 5\% + \frac{4.71(10\% - 5\%)}{4.71 + 19.59}$$

$$= 6\%$$

The **after tax cost of debt** is therefore 6%

Number of shares issued by KFP Co = $15m/0.5 = 30 million shares

V_E = 30 million × $4.20
     = $126 million

V_D = 15 million × 94.74/100
     = $14.211

$$\text{WACC} = k_e\left(\frac{V_E}{V_E + V_D}\right) + k_d\left(\frac{V_D}{V_E + V_D}\right)$$

$$= 11.8\left(\frac{126}{126 + 14.211}\right) + 6\left(\frac{14.211}{126 + 14.211}\right)$$

$$= 10.6\% + 0.6\%$$

$$= \mathbf{11.2\%}$$

(b) (i)   **Price/earnings ratio method**

Earnings per share of NGN = 80c per share

P/E ratio of KFP Co = 8

Share price of NGN = EPS × P/E of KFP co
                    = 80c × 8
                    = 640c = $6.40

Number of ordinary shares of NGN = 5/0.5 = 10 million shares

Value of NGN = $6.40 x 10 million shares
         = **$64 million**

(ii) **Dividend growth model**

Payout ratio = 45%

Dividend per share of NGN = 80c × 45% = 36c

As the payout ratio has been maintained for several years, we can assume that recent earnings growth of 4.5% is the same as the dividend growth rate.

$$P_o = \frac{D_o(1+g)}{K_e - g}$$

Value of shares $= \dfrac{0.36 \times (1 + 0.045)}{0.12 - 0.045}$
          $= \$5.02$

Value of NGN = $5.02 × 10 million shares
       = **$50.2 million**

(c) **Capital structure**

In general, equity is considered to be **riskier** than debt finance and is therefore **more expensive**. There are contrasting views on the relationship between the choice of equity or debt finance and the effect on the weighted average cost of capital (WACC).

Traditional view

The traditional view of capital structure is that there is an **optimal capital structure** and the company can minimise its WACC and therefore increase its total value, by a suitable use of debt finance in its capital structure.

As the level of gearing increases, the **cost of debt** remains **unchanged** up to a certain level of gearing. Beyond this level, the cost of debt will rise. The **cost of equity** rises as the level of gearing increases and financial risk increases. The **WACC** therefore falls initially as the proportion of debt capital increases, and then begins to increase as the rising cost of equity becomes more significant.

The **optimum level of gearing** is where the company's WACC is **minimised.**

Modigliani and Miller

Modigliani and Miller stated that in a **perfect capital market** with **no taxes**, a company's capital structure would have **no effect** on its WACC.

As the level of gearing increases, the cost of equity rises at a rate that exactly cancels out the effect of cheaper debt. This combines to keep the **WACC constant**.

The effect of tax

Modigliani and Miller modified their assumption of no tax and admitted that **tax relief** on interest payments does lower the WACC. The tax savings arising are the **tax shield** and this enables the WACC to **fall** up to a gearing of 100%. This suggests that companies should have a capital structure made up entirely of debt. This does not happen in practice due to the existence of **market imperfections** such as bankruptcy risk and agency costs, which undermine the tax advantages at high levels of gearing.

Pecking order theory

Pecking order theory has been developed as an alternative to traditional theory. It states that firms will prefer **retained earnings** to any other sources of finance, and then will choose debt and last of all equity.

Companies may therefore choose not to seek to minimise their WACC.

Using debt to finance a cash offer for NGN

The amount of finance required is between $50.2 million and $64 million. This may be even higher if a **premium** is required to persuade NGN's owners to sell.

The **current gearing** (debt/equity) ratio for KFP Co is 60% (15m/25m). After the acquisition, debt would increase by at least $50.2m of bid finance and $20m of existing NGN debt. Gearing would therefore **increase** to 341% (15 + 50.2 + 20/25).

This is a very high level of gearing and KFP Co would need to consider the **risks** associated with this, such as not being able to pay the interest and potential bankruptcy. The key question is whether the benefits to be gained from the acquisition outweigh the additional costs and risks of the amount of debt finance required.

57 Marton Co

Text references. Working capital management is covered in Chapters 4, 5 and 6. Foreign currency risk is covered in Chapter 19.

Top tips. This is a wide-ranging question on management of receivables, both domestic and foreign and makes an excellent revision question for the subject. In part (b) the emphasis should have been on the specific services offered by *overseas* as opposed to domestic factors.

(a)   Relative costs and benefits of the two proposals for reducing UK receivables

Option 1: factoring

Top tips. A 'with recourse' service implies that the factor does not guarantee against bad debts. Marton can therefore choose whether it takes up the credit insurance facilities or not. Unfortunately the question does not give any information about the current or expected level of bad debts which would be useful in making this decision. We have assumed that the insurance is taken up, but we cannot put in any figure for bad debts saved.

The question gives no indication of the level of bad debts which are being borne at the moment. It is therefore impossible to say whether the credit insurance is worthwhile or not. If the credit insurance is compulsory, then the factoring agreement is non-recourse, not with-recourse.

UK sales are £20 million in 365 days.

If the **receivable collection period** is reduced by 15 days, the reduction in receivables will be:

15/365 × £20 million = £821,918.

The cash inflow is used to reduce the overdraft, giving an annual interest saving of:

13% × £821,918 = £106,849.

Thus:

	£	£
Administrative savings		200,000
Annual interest saved		106,849
Total savings		306,849
Factor's service charge: 1% × $20 million	200,000	
Credit insurance (if taken)	80,000	
		280,000
Net benefit to profit before tax		26,849

Option 2: prompt settlement discounts

The effect of the discount scheme is that 50% of UK receivables will pay faster than before. The remaining 50% are unchanged.

Before the discount scheme is in place, 50% of UK receivables is 50% × £4.5 million = £2.25 million.

After the scheme is introduced:

Customers		Sales value		Receivables
		£'000		£'000
Paying within 10 days:	20%	4,000	4,000 × 10/365	109,589
Paying within 20 days:	30%	6,000	6,000 × 20/365	328,767
	50%	10,000		438,356

After the discount scheme gets going, the value of receivables for 50% of the sales will be reduced from £2,250,000 to £438,356. The remaining receivables will be unchanged.

Reduction in receivables = £2,250,000 − £438,356 = £1,811,644.

Again, the resulting cash inflow is used to reduce the overdraft, saving interest:

		£	£
Annual interest saving:	13% × £1,811,644		235,514
Cost of discount:			
Customers paying within 10 days	20% × £20m × 3%	120,000	
Customers paying within 20 days	30% × £20m × 1.5%	90,000	
			210,000
Net gain			25,514

> **Top tips.** Because there will be a transition period during the first few months while receivables move from £2,250,000 down to £438,356, the annual interest saving figure is slightly overstated. In this style of question you are not expected to calculate the accurate interest saving figure by looking at receivables month by month.

On the basis of the above figures, the factoring option appears to be marginally better. Two other considerations weigh in favour of factoring:

(i) **Need for credit insurance**

It is not obvious that the **credit insurance** is required. An examination of the current level of bad debts is needed. If the credit insurance can be avoided, there is a clear advantage to the factoring agreement.

(ii) **Risk**

Risk is far lower for the **factoring** scheme than the discount scheme. The estimates of proportions of receivables taking the discount in the prompt payment scheme are subject to extreme uncertainty and the vagaries of human nature. For example, some large customers may insist on the discount and then pay late. By contrast, all the key elements of the factoring scheme are negotiable 'up front' and can be written into the contract. For example, if the factor does not pay within the agreed period, the service fee is reduced or avoided.

(iii)   **Customer confidence**

The disadvantage of factoring, that it supposedly reduces customer confidence, is probably not significant. The customers most likely to be 'put off' are those who are aiming to take more credit than they are entitled to do.

Conclusion

It is therefore recommended that the factoring services are used.

(b)   **Overseas factoring**

For a company with annual overseas credit sales of at least £250,000, **overseas factors** offer the same basic facilities as domestic factors. Broadly, these facilities are the collection of debts, sales ledger management and provision of flexible finance based on the size of the sales ledger.

Non-recourse factoring

Non-recourse factoring means that the factor will bear the risk of bad debts. With recourse means that the factor can return to the principal and say that a debt is irrecoverable. For overseas sales especially, non-recourse factoring is preferable and can be a cheaper alternative than using documentary letters of credit.

Additional services

Overseas factors offer two additional services which are valuable to firms without much experience of exporting:

(i)   **Handling export sales documentation**
(ii)   Providing a **credit rating service** on potential overseas customers

(c)   (i)   **Losses** on sales receipts will be **sustained** if the dollar weakens relative to sterling, ie if there are more dollars to each pound.

		£
Current export sales in £		5,000,000
Spot exchange rate $/£	1.45	
Current $ value of export sales at spot rate 1.45 $/£	$7,250,000	
Maximum forecast $/£	1.60	
£ value of $7.25 million at 1.60 $/£		4,531,250
Maximum exchange loss if no hedge used		(468,750)

(ii)

		£
Agreed forward rate for $/£	1.55	
Selling $7.25m forward at 1.55 $/£ gives		4,677,419
Best possible result is when $/£ strengthens to	1.30	
£ value of $7.25 million at 1.30 $/£		5,576,923
Maximum opportunity cost		(899,504)

(iii)   **Hedging**

Hedging foreign currency risk means taking action to reduce that risk in the sense that the cash flow is made more predictable and the chance of a large unexpected currency loss is eliminated.

Benefits and drawbacks

The advantage of predictable cash flows is that cash planning is made easier and it is easier to raise loans. However, it must be recognised that in eliminating the chance of a large loss, the company loses the chance of currency gains and can also pay a high price to bankers in the long run unless it is dealing in very large sums of foreign currency.

Forward contracts

A popular currency hedge is the forward contract of the type described in this question. However the forward rate given (1.55 $/£) appears to be very expensive compared with the most likely value of the future $/£ spot rate estimated by the company's advisors (1.45 $/£). This estimate must be

investigated further, as it may be inaccurate. In general, it is likely to be better to confine forward contracts to high value dollar sales, bearing the risk on lower value invoices.

Borrowing in dollars

If Marton's dollar receivables are fairly constant in value, an alternative and better hedging technique would be to **switch some of its borrowing** from sterling to US dollars (ie take out a US dollar overdraft). The amount of borrowing should be roughly equal to the value of dollar receivables. Any loss on the receivables is then countered by an equal and opposite gain on the overdraft and vice versa.

58 SDT

Text references. Foreign currency risk is covered in Chapter 19.

Top tips. Note the requirements in (a) require **critical** commentary, which should have indicated to you the need to explain why the director's views were wrong.

The main problem in (b) appears to have been identifying which figure you had to calculate, indicating you needed to read the question carefully. The greater of the two relevant exchange rates is used in every calculation, as in each case SDT is receiving the foreign currency, and is having to pay the higher amount to obtain each £ that it wants.

(c) is a straightforward look at the higher risks that mean a higher return is required. (d) can bring in debtor management as well as option forward contracts.

(a)   The main problems with the Managing Director's views are:

(i)   **Conditions for efficiency**

The conditions for efficiency are **market liquidity**, **full information** and **freely floating currencies**. In practice liquidity and information available varies between currencies. Many currencies are at most subject to managed floating, floating within limits decided (possibly in secret) by governments. However conditions for efficiency will apply more to the major currencies in the scenario, and gains and losses from each individual currency may be equally likely.

(ii)   **Limited range of currencies**

Although the managing director is correct in saying that the risk is diversified, it is not diversified across all currencies. It is possible that the £ may move in an **adverse direction** against each of the three currencies, if for example the UK's inflation rate was higher than other major nations or because of interdependence between the economies. In fact the currencies quoted are known as the Triad because the countries are similar markets, so in practice there might be **positive correlation between the three** and hence diversification over them will increase the risk of losses.

(iii)   **Hedging sales only**

Foreign exchange risk is enhanced because it is only in one direction, for **sales**. As purchases are all in £, there is no matching of sales and purchases in the same currency which will limit foreign exchange risk.

Currency hedging may be beneficial for the following reasons, although it will incur costs:

(i)   **Risk limitation**

Hedging risk can mean that the amounts SDT receives can be **fixed**, and SDT is not **subject to adverse fluctuations**. In an efficient market, prices respond to new information, so shocks may have unexpected effects on exchange rates.

(ii)   **Size of possible losses**

Because SDT exports over 90% of its production, **potential losses** from adverse events could be **very large**.

(iii) **Improved forecasting**

Fixing the amounts to be received will also help **internal forecasting and budgeting procedures**.

Conclusion

Bearing these considerations in mind, SDT needs to consider hedging risk

(b) (i) (1) **A**

Contribution = (9,487,500/200.032) − (2.75 × 9,487,500/632.50)

= 47,430 − 41,250
= £6,180

B

Contribution = (82,142/1.7775) − (4.80 × 82,142/10.2678)

= 46,212 − 38,400
= £7,812

Europe

Contribution = (66,181/1.4784) − (6.25 × 66,181/12.033)

= 44,765 − 34,375
= £10,390

(2) **A**

Contribution = (9,487,500/202.63) − 41,250

= 46,822 − 41,250
= £5,572

B

Contribution = (82,142/1.7750) − 38,400

= 46,277 − 38,400
= £7,877

Europe

Contribution = (66,181/1.4680) − 34,375

= 45,082 − 34,375
= £10,707

(ii) **Hedging**

$$\text{Contribution to sales ratio} = \frac{6,180 + 7,812 + 10,390}{47,430 + 46,212 + 44,765} = 17.62\%$$

Not hedging

$$\text{Contribution/sales ratio} = \frac{5,572 + 7,877 + 10,707}{46,822 + 46,277 + 45,082} = 17.48\%$$

Hedging leads to a higher contribution per sale than not hedging and accordingly SDT should hedge its foreign exchange exposure.

(c) **Reasons for generating higher rates of return**

Businesses will try to generate higher contributions from export sales as they appear to be riskier than domestic sales.

Foreign exchange risk

Foreign exchange risk will mean that the **receipts** are **uncertain**, unless the exports are **invoiced** in the **domestic currency**.

Physical risk

Because of the greater distances, there may be an increased risk of the goods being **lost, damaged or stolen in transit**, or the documents accompanying the goods going astray.

Credit risk

There may be a higher risk in allowing customers credit because **researching** their suitability is more difficult than domestic customers. Payments may be **slower** from **overseas customers**, and it may be difficult and costly to monitor and pursue customers who fail to pay promptly or at all.

Trade risk

Because of the large distances travelled, there may be a risk that the customers **do not accept** the **goods** when delivered, or that the order is cancelled in transit.

Political risk

Overseas governments may impose a **variety of rules and restrictions**, including **higher quality standards** than are imposed in the company's own domestic market.

Risk mitigation

The effects of all these risks can be mitigated by **hedging techniques** for foreign exchange currency, **insuring** against the **risks** or reducing the risk of problems by, for example, using **credit reference agencies** to report on customers. However all of these will have a cost, and increased sales revenues will cover those costs.

Investment

If costs of investment are **higher abroad** than at home, increased revenues will be required to cover these. This includes not only capital costs, but also costs of investing in administration and specialist trading and treasury staff.

(d) **Risk**

The risk is that SDT will be forced to **buy currency at a poorer spot rate**, in order to be able to sell it to the bank at the forward rate. If the customer subsequently fulfils the contract, SDT may not be able to recoup the loss it has made. Alternatively SDT may take out another forward contract up until the time that the customer is expected to pay, but this may be on poorer terms than the original contract. **Transaction costs** will also be incurred.

Risk reduction procedures

(i)   The risk can be avoided by taking out **insurance** against the possibility of the customers failing to fulfil their obligations, although a premium will be payable.

(ii) SDT could **reduce the risk of the customers paying late** by offering a discount for payment on time; the cost then would be the amount of the discount. Alternatively SDT could specify **penalties** for late payment; this would reduce the cost for SDT if payment was late.

(iii) SDT could take out an **option forward contract** that would give it some leeway as to the date the contract will be fulfilled. However there would be **increased transaction costs**, and SDT would have to accept the worst exchange rate over the period the option could be exercised.

59 BS

(a) (i) Since both the receipts and payments are expected to occur **on the same date**, BS plc need only hedge the net amount, ie a receipt of $200,000 ($450,000 – $250,000). To hedge this transaction, a three-month forward contract to sell dollars will be required.

The **transaction cost** will be paid immediately in US$. BS must therefore **buy dollars now** to cover this at the spot rate of $1.6540/£.

The net receipt can now be calculated:

	£
Sterling proceeds in 3 months' time: $200,000 ÷1.6513	121,117
Transaction costs: $200,000 × 0.2% ÷ 1.6540	(242)
Net receipt	120,875

(ii) Since the company is expecting to receive dollars, to effect a money market hedge it will need to **borrow dollars now** in anticipation. The sum to be borrowed must be just enough so that the receipt in three months' time will repay the loan and the interest due for the period.

The money will be borrowed in the US at an annual rate of 6%. This equates to a three month rate of 1.5% (6%/4). The amount to be borrowed in dollars is therefore $200,000 ÷ 1.015 = $197,044. These dollars will be sold now at the spot rate of $1.6590/£ to realise £118,773.

This **sterling amount** can now be invested in the UK at an annual rate of 6.5%. This equates to a three-month rate of 1.625%. The value of the deposit at the end of the three month period when the dollar loan is repaid will be £118,773 × 1.01625 = £120,703.

The transaction cost will be the same as for the forward market hedge. The net receipt under this method will therefore be £120,703 – £242 = **£120,461**.

The receipts are highest if the **forward market hedge** is used, and this will therefore be the **preferred method**.

(b) **Factors to consider**

   (i)   The **relative costs** of the different options
   (ii)   The **ability of the staff** to **manage the techniques**, given that there is not a specialist treasury department
   (iii) The **attitude of the company to risk**
   (iv)   The **size of the transaction** in relation to the company's overall operations, and therefore the scale of the risks involved
   (v)   The **perceived level of risk** attached to the currencies in question

   Alternative options to minimise risk

   (i)   **Operating bank accounts in foreign currencies.** This is only an option if the company has regular transactions in the currencies in question.
   (ii)   The **use of multilateral netting**. This will only be possible if there are a large number of foreign currency transactions.
   (iii) The company could consider the **use of swaps and option contracts**.

(iv)   The company could consider the **cost and viability** of insisting that more of its contracts are denominated in sterling.

(c)   **The causes of exchange rate fluctuations**

Currency supply and demand

The exchange rate between two currencies – ie the buying and selling rates, both 'spot' and forward – is determined primarily by supply and demand in the foreign exchange markets. Demand comes from individuals, firms and governments who want to buy a currency and supply comes from those who want to sell it.

Supply and demand for currencies are in turn influenced by:

- The rate of inflation, compared with the rate of inflation in other countries
- Interest rates, compared with interest rates in other countries
- The balance of payments
- Sentiment of foreign exchange market participants regarding economic prospects
- Speculation
- Government policy on intervention to influence the exchange rate

Interest rates

The difference between spot and forward rates reflects differences in interest rates. If this were not so, then investors holding the currency with the lower interest rates would switch to the other currency for (say) three months, ensuring that they would not lose on returning to the original currency by fixing the exchange rate in advance at the forward rate. If enough investors acted in this way (known as arbitrage), forces of supply and demand would lead to a change in the forward rate to prevent such risk-free profit making.

The principle of **interest rate parity** links the foreign exchange markets and the international money markets.

Inflation

Purchasing power parity theory predicts that the exchange value of foreign currency depends on the relative purchasing power of each currency in its own country and that spot exchange rates will vary over time according to relative price changes.
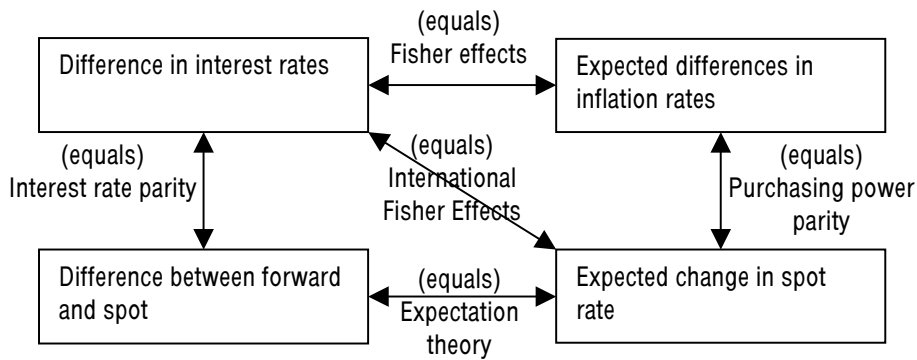
In the real world, exchange rates move towards purchasing power parity only over the long term.

Countries with relatively **high** rates of inflation will generally have high nominal rates of interest, partly because high interest rates are a mechanism for reducing inflation, and partly because of the **Fisher effect**: higher nominal interest rates serve to allow investors to obtain a high enough real rate of return where inflation is relatively high.

According to the international Fisher effect, interest rate differentials between countries provide an unbiased predictor of future changes in spot exchange rates. The currency of countries with relatively high interest rates is expected to depreciate against currencies with lower interest rates, because the higher interest rates are considered necessary to compensate for the anticipated currency depreciation. Given free movement of capital internationally, this idea suggests that the real rate of return in different countries will equalise as a result of adjustments to spot exchange rates.

Four-way equivalence

The four-way equivalence model states that in equilibrium, differences between forward and spot rates, differences in interest rates, expected differences in inflation rates and expected changes in spot rates are equal to one another.

	(equals) Fisher effects	
Difference in interest rates		**Expected differences in inflation rates**
(equals) Interest rate parity	(equals) International Fisher Effects	(equals) Purchasing power parity
Difference between forward and spot	(equals) Expectation theory	**Expected change in spot rate**

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> **Text references.** Foreign currency risk is covered in Chapter 19.
>
> **Top tips.** In part (a), using numerical examples will help you to discuss the differences between the different types of risk.
>
> The purchasing power parity formula relating inflation rates to exchange rates is on the formula sheet so you simply need to be able explain what it means in part (b).
>
> Parts (c) and (d) are standard hedging calculations that you should be able to do if you have practised the methods.
>
> **Easy marks.** There are five parts to this question, each with a relatively small mark allocation so you should be able to pick up marks on some parts, even if you find this part of the syllabus challenging.

Marking scheme

				Marks
(a)	Transaction risk		2	
	Translation risk		2	
	Economic risk		<u>2</u>	
				6
(b)	Discussion of purchasing power parity		4-5	
	Discussion of interest rate parity		<u>1-2</u>	
		Maximum		6
(c)	Netting		1	
	Sterling value of 3-month receipt		1	
	Sterling value of 1-year receipt		<u>1</u>	
				3
(d)	Evaluation of money market hedge		4	
	Comment		<u>1</u>	
				5
(e)	Definition of currency futures contract		1-2	
	Initial margin and variation margin		1-2	
	Buying and selling of contracts		1-2	
	Hedging the three-month receipt		<u>1-2</u>	
		Maximum		<u>5</u>
				<u>25</u>

(a) **Transaction risk**

This is the risk of adverse exchange rate movements occurring in the course of **normal international trading transactions**. This arises when the prices of imports or exports are fixed in foreign currency terms and there is movement in the exchange rate between the date when the price is agreed and the date when the cash is paid or received in settlement.

For example, a sale worth $3,000 when the exchange rate is $1.7820 per £ has an expected sterling value of £1,684. If the dollar has **depreciated** against sterling to $1.8500 per £ when the transaction is settled, the sterling receipt will have fallen to £1,622.

Transaction risk therefore affects cash flows so companies often choose to **hedge** or protect themselves against transaction risk.

Translation risk

This is the risk that the organisation will make exchange losses when the accounting results of its foreign branches or subsidiaries are **translated** into the home currency. Translation losses can result, for example, from restating the book value of a foreign subsidiary's assets at the exchange rate on the balance sheet date.

For example, an asset is valued on a balance sheet at $14 million and was acquired when the exchange rate was $1.79 per £. One year later, the exchange rate has moved to $1.84 per £ and the balance sheet value of the asset has changed from $7.82 million to $7.61 million, resulting in an **unrealised** (paper) **loss** of $0.21 million.

Translation risk does not affect cash flows so does not **directly** affect shareholder wealth. However, **investors** may be influenced by the changing values of assets and liabilities so a company may choose to hedge translation risk through, for example **matching the currency of assets and liabilities**. For example an asset denominated in euros would be financed by a euro loan.

Economic risk

This refers to the effect of exchange rate movements on the **international competitiveness** of a company. For example, a UK company might use raw materials which are priced in US dollars, but export its products mainly within the EU. A depreciation of sterling against the dollar or an appreciation of sterling against other EU currencies will both erode the competitiveness of the company. Economic exposure can be difficult to avoid, although **diversification of the supplier and customer base** across different countries will reduce this kind of exposure to risk.

(b) **Purchasing power parity theory**

Purchasing power parity theory states that the exchange rate between two currencies is the same in equilibrium when the purchasing power of currency is the same in each country.

The theory predicts that the exchange value of foreign currency depends on the relative purchasing power of each currency in its own country and that **spot exchange rates will vary over time according to relative price changes.**

Formally, purchasing power parity can be expressed in the following formula.

$$F_0 = S_0 \times \frac{(1+i_c)}{(1+i_b)}$$

Where F_0 = expected spot rate
  S_0 = current spot rate
  i_c = expected inflation rate in country c
  i_b = expected inflation rate in country b

This relationship has been found to hold true in the longer term and so tends to be used for forecasting exchange rates a number of years into the future, rather than for forecasting less than one year ahead.

For shorter periods, forward rates can be calculated using **interest rate parity theory**, which suggests that changes in exchange rates reflect differences between interest rates in different countries.

(c)   **Forward market**

Net receipt in one month = $(240,000 − 140,000) = $100,000
Nedwen Co needs to sell $s at an exchange rate of 1.7829 + 0.0003 = $1.7832 per £
Sterling value of net receipt = $100,000/1.7832 = £56,079

Receipt in three months = $300,000
Nedwen Co needs to sell $s at an exchange rate of 1.7846 + 0.0004 = $1.7850 per £
Sterling value of receipt = $300,000/1.7850 = £168,067

(d)   **Money market hedge**

Expected receipt after three months = $300,000

$ interest rate over three months = 5.4/4 = 1.35%

$s to borrow now in order to have $300,000 liability after three months = $300,000/1.0135 = $296,004

Spot rate for selling $s = 1.7820 + 0.0002 = $1.7822 per £

Sterling deposit from borrowed $s at spot = $296,004/1.7822 = £166,089

Sterling interest rate over three months = 4.6/4 = 1.15%

Value in three months of sterling deposit = £166,089 × 1.0115 = $167,999

In conclusion, the forward market is marginally preferable to the money market hedge for the $ receipt expected after three months.

(e)   A **currency futures contract** is a standardised contract for the sale or purchase at a set future date of a set quantity of currency.

A **future** represents a commitment to an additional transaction in the future **that limits the risk** of existing commitments.

It is traded on a **futures market** and **settlement** takes place in three-monthly cycles ending in March, June, September and December.

The **contract price** is the price at which the futures contract can be bought or sold. For all currency futures the contract price is in US dollars. The contract price is the figure which is traded on the futures exchange. It changes continuously and is the basis for computing gains or losses.

When a currency futures contract is bought or sold, the buyer or seller is required to deposit a sum of money with the exchange. This is called the **initial margin**. If losses are incurred as exchange rates and therefore currency futures prices change, the buyer or seller may be called on to deposit additional funds with the exchange. This is the **variation margin.** In the same way profits are credited to the margin account on a **daily basis**.

Most currency futures contracts are **closed out** before their settlement dates by undertaking the **opposite** transaction to the initial futures transaction. For example, if the initial transaction is buying currency futures, it is closed out by selling currency futures. A gain made on the futures transaction will **offset** a loss made on the currency markets and vice versa.

Nedwen Co expects to receive $300,000 in three months' time and would want to hedge against an **appreciation** (strengthening) in sterling as this would reduce the sterling receipt. This could be achieved by **buying** sterling futures contracts. As it is now 1st April, Nedwen would buy June futures contracts. In June, Nedwen would **buy** the same number of futures and exchange the $300,000 receipt on the currency market.

61 Boluje Co

Text references. Debt finance is covered in Chapters 12 and 14, debt valuation in Chapter 17 and exchange rate risk in Chapter 19.

Top tips. Your written answers must be in enough detail to get the available marks in this question. An answer plan is essential in parts (a) and (d) to make sure your answer is logical, sensible and answers the specific requirements of the question. You can answer these parts even if you struggle with the calculations in parts (b) and (c).

Marking scheme

			Marks
(a)	Relevant discussion		7
(b)	Market value of each foreign bond	3	
	Total market value of foreign bonds	1	
			4
(c)	(i) Explanation of money market hedge	2	
	Illustration of money market hedge	2	
			4
	(ii) Comparison with forward market hedge		2
(d)	Discussion of natural hedge	1-2	
	Description of other hedging methods	6-7	
		Maximum	8
			25

(a)   **Debt finance**

A company has a choice when deciding how to finance a new investment. **Pecking order theory** suggests that the company will first choose **retained earnings** if they are available rather than go to the trouble of obtaining external finance and have to live up to the demands of external finance providers.

The next choice in the pecking order is **debt finance** which will be preferred to equity finance. Perhaps the current shareholders will be unwilling to **contribute additional capital**; possibly the company does not wish to involve outside shareholders who will have more onerous requirements than current members.

Other reasons for choosing debt finance may include **lesser cost** and **easier availability**, particularly if the company has little or no existing debt finance. Debt finance provides **tax relief** on interest payments.

According to the traditional theory of capital structure, the weighted average cost of capital will fall initially as debt is introduced, as debt has a **lower cost** than equity. It will continue to fall until the **optimal capital structure** is achieved. The company can therefore **increase its market value** by increasing the level of debt finance up to this point.

The use of debt is a **signal of confidence in the company's cash flows** and the use of debt is a **discipline on management** as careful cash flow management is needed. A new, growing business will find it difficult to forecast cash flows with any certainty so high levels of gearing are unwise.

(b)   Annual interest paid per foreign bond = 500 × 6.1% = 30·5 pesos

Redemption value of each foreign bond = 500 pesos

Cost of debt of peso-denominated bonds = 7% per year

Market value of each foreign bond

Period		Cash flow	Discount factor	Present value
		Pesos	7%	Pesos
1-5	Interest	30.5	4.100	125.05
5	Redemption	500	0.713	356.50
				481.55

Current total market value of foreign bonds = 16m × (481·55/500) = **15,409,600 pesos**

(c)   (i)   Interest payment in one year's time = 16m × 6.1% = 976,000 pesos

A **money market hedge** would involve placing on deposit an amount of pesos that, with added interest, would be enough to pay the peso-denominated interest in one year. The interest on the peso-denominated deposit is **guaranteed** and therefore Boluje Co would be protected against any unexpected or adverse exchange rate movements prior to the interest payment being made.

Peso deposit required = 976,000/ 1·05 = 929,524 pesos

Dollar equivalent at spot = 929,524/6 = $154,921

Dollar cost in one year's time = 154,921 × 1·04 = **$161,118**

(ii)   Cost of **forward market hedge** = 976,000/6·07 = **$160,790**

The forward market hedge is slightly cheaper.

(d)   **Hedging against exchange rate risk**

Matching receipts and payments

Wherever possible, a company that expects to make payments and have receipts in the same foreign currency should plan to **offset its payments against its receipts in the currency**. For example, Boluje receives income in pesos from its export sales and makes interest payments in pesos. Since the company will be setting off foreign currency receipts against foreign currency payments, it does not matter whether the currency strengthens or weakens against the company's 'domestic' currency because there will be no purchase or sale of the currency.

The process of matching is made simpler by having **foreign currency accounts** with a bank. Receipts of foreign currency can be credited to the account pending subsequent payments in the currency.

Leading and lagging

A **lead payment** is a payment in advance which would not be beneficial to Boluje as the peso is **depreciating** against the dollar.

A **lagged payment** involves delaying payments beyond their due date. This is also inadvisable as late payments risk a problem with suppliers.

Foreign currency derivatives

Currency futures

A **currency futures contract** is a standardised contract for the sale or purchase at a set future date of a set quantity of currency. A **future** represents a commitment to an additional transaction in the future **that limits the risk** of existing commitments. It is traded on a **futures market** and **settlement** takes place in three-monthly cycles. Most currency futures contracts are **closed out** before their settlement dates by undertaking the **opposite** transaction to the initial futures transaction. For example, if the initial transaction is buying currency futures, it is closed out by selling currency futures. A gain made on the futures transaction will **offset** a loss made on the currency markets and vice versa.

The **disadvantages** of futures contracts are that the **contracts cannot be tailored** to the user's exact requirements. **Hedge inefficiencies** are caused by having to deal in a **whole number of contracts** and by **basis risk** (the risk that the futures contract price may move by a different amount from the price of the underlying currency or commodity) .

Currency options

A **currency option** is a right of an option holder to buy (call) or sell (put) foreign currency at a specific exchange rate at a future date. Currency options protect against **adverse exchange rate movements** while allowing the investor to take advantage of favourable exchange rate movements. They are particularly useful in situations where the cash flow is not certain to occur (eg when tendering for overseas contracts).

Companies can choose whether to buy a tailor-made currency option from a bank, suited to the company's specific needs (**over-the-counter** options), or a standard option, in certain currencies only, from an options exchange (**traded** options). Buying a currency option involves **paying a premium**, which is the most the buyer of the option can lose.

The **drawbacks** of currency options are that the **cost** depends on the **expected volatility** of the **exchange rate** and options must be paid for **as soon** as they are **bought**.

Currency swaps

Currency swaps effectively involve the exchange of debt from one currency to another. A swap is a formal agreement whereby two organisations contractually agree to exchange payments on different terms, eg in different currencies, or one at a fixed rate and the other at a floating rate. Currency swaps can provide a hedge against exchange rate movements for **longer periods** than the forward market, and can be a means of obtaining finance from new countries.

Swaps are **easy to arrange** and are **flexible** since they can be arranged in any size and are reversible. **Transaction costs are low**, only amounting to legal fees, since there is no commission or premium to be paid.

62 Preparation question: Interest rates

Text reference. Interest rate risk is covered in Chapter 20.

Top tips. This is the only type of calculation on interest rate hedging that is examinable so make sure you are competent at this calculation and can explain it.

You should go through (b) very carefully, as the points are very important. (c) develops the issue of how changes in the cost of capital affect financial policy. Note that changes in the cost of capital will affect **investing** decisions (because the weighted average cost of capital is lower and returns are increased due to a rise in demand), and **financing** decisions (because of changes in the relative attractiveness of different sources of finance). The last paragraph demonstrates how investing and financing decisions may be interlinked.

(a)　(i)　**Procedure for FRAs**

A company can hedge its risk by entering into a forward rate agreement with a bank that **fixes the rate of interest** for borrowing at a certain time in the future. If the actual interest rate proves to be higher than the rate agreed, the bank pays the company the difference. If the actual interest rate is lower than the rate agreed, the company pays the bank the difference.

Advantages of FRAs

An **advantage** of FRAs is that, for the period of the FRA at least, they **protect the borrower** from adverse market interest rate movements to levels above the rate negotiated for the FRA. With a normal variable rate loan (for example linked to a bank's base rate or to LIBOR) the borrower is exposed to the risk of such adverse market movements. On the other hand, the borrower will similarly not benefit from the effects of favourable market interest rate movements.

The FRA required in this situation is '3-9'.

(ii)　At 6% because interest rates have fallen, Bash Co will pay the bank:

	£
FRA payment £20 million $\times$ (7% − 6%) $\times$ $^6/_{12}$	(100,000)
Payment on underlying loan 6% $\times$ £20 million $\times$ $^6/_{12}$	(600,000)
Net payment on loan	(700,000)
Effective interest rate on loan	7%

At 9% because interest rates have risen, the bank will pay Bash Co:

	£
FRA receipt £20 million $\times$ (9% − 7%) $\times$ $^6/_{12}$	200,000
Payment on underlying loan at market rate 9% $\times$ £20 million $\times$ $^6/_{12}$	(900,000)
Net payment on loan	(700,000)
Effective interest rate on loan	7%

(b)　**Implications of a fall in interest rates for a typical company**

(i)　The **cost of floating rate borrowing will fall**, making it more attractive than fixed rate borrowing. For most companies with borrowings, interest charges will be reduced, resulting in higher profitability and earnings per share.

(ii)　The **value of the company's shares will rise,** both because of the higher level of company profitability and also because of the lower alternative returns that investors could earn from banks and deposits, if interest rates are expected to remain low in the longer term.

(iii)　The **higher share value results in a lower cost of equity capital**, and hence a lower overall cost of capital for the company. Investment opportunities that were previously rejected may now become viable.

(iv)　As interest rates fall, consumers have **more disposable income.** This may increase demand for the company's products. Falling returns on deposits may, however, encourage many people to save more, rather than spend.

(c)　**Change in cost of capital**

As explained above, if interest rates are expected to remain low in the longer term, the company's **overall cost of capital** will **fall**. The discount rates used in investment appraisal will therefore be lower, making **marginal projects** more **profitable**, with a resulting increase in the company's investment opportunities.

Investment policy review

The **cash flows** from all **possible investments** should be reviewed in the light of falling interest rates and the possible effects on consumer demand and the sterling exchange rate. These cash flows should then be **appraised** at the **new lower discount rates** and the project portfolio ranked and reviewed. The company's investment plans are likely to be expanded, unless constrained by other factors such as lack of skills or management time.

Introduction of debt

When interest rates are expected to fall in the future, an ungeared company may be tempted to **introduce debt** into its capital structure. If fixed interest rates are high at the moment, **floating rate debt** may be **more attractive**, because it allows the company to take advantage of falling interest rates.

Setting gearing level

New projects may be financed entirely by borrowings until an appropriate gearing level is reached. As gearing is increased, the company's **cost of capital** is usually **reduced** because of the **tax relief** on debt interest but, if gearing is increased to too high a level, increased risks of bankruptcy arise, causing the cost of capital to rise.

Choice of projects

If the company is tempted to increase its debt financing substantially, this may affect which investment projects are undertaken, as some projects are more suitable for debt financing than others. Generally, a project with significant tangible assets and stable cash flows will be most suitable for financing by debt.

63 Preparation question: QW

> **Text references**. Interest rate risk is covered in Chapter 20.
>
> **Top tips.** This is a completely discursive question which covers a broad range of issues. Part (a) is a straightforward explanation of interest rate risk, which you should be completely happy with.
>
> Part (b) gives you the chance to explain the purposes of derivatives in detail, showing the possible costs and the effects on risks. Your answer to (c) should concentrate on the main points of comparison (costs, flexibility, what each instrument achieves).

(a) **Interest rate risk** is faced by companies with floating and fixed rate debt. It can arise from **gap exposure** and **basis risk.**

Interest rate risk relates to the sensitivity of profit and cash flows to changes in interest rates. An organisation will need to analyse how profits and cash flows are likely to be affected by forecast changes in interest rates and decide whether to take action.

Floating interest rate debt

The most common form of interest rate risk faced by a company is the volatility of cash flows associated with a high proportion of floating interest rate debt. Floating interest rates, of course, change according to general market conditions.

Some of the interest rate risks to which a firm is exposed may cancel each other out, where there are both assets and liabilities with which there is exposure to interest rate changes. If interest rates rise, more interest will be payable on loans and other liabilities, but this will be compensated for by higher interest received on assets such as money market deposits.

Fixed interest rate debt

A company with a high proportion of fixed interest rate debt has a commitment to fixed interest payments. If interest rates fall sharply, the company will suffer from a loss of competitive advantage compared with companies using floating rate borrowing whose interest costs and cost of capital will fall.

Gap exposure

The degree to which a firm is exposed to interest rate risk can be identified by using the method of gap analysis. Gap analysis is based on the principle of grouping together assets and liabilities which are sensitive to interest rate changes according to their maturity dates. Two different types of 'gap' may occur.

A negative gap occurs when a firm has a larger amount of interest-sensitive liabilities maturing at a certain time or in a certain period than it has interest-sensitive assets maturing at the same time. The difference between the two amounts indicates the net exposure.

There is a **positive gap** if the amount of interest-sensitive assets maturing in a particular time exceeds the amount of interest-sensitive liabilities maturing at the same time.

With a negative gap, the company faces exposure if interest rates rise by the time of maturity. With a positive gap, the company will lose out if interest rates fall by maturity.

Basis risk

It may appear that a company which has size matched assets and liabilities, and is both receiving and paying interest, may not have any interest rate exposure. However, the two floating rates may not be determined using the same basis. For example, one may be linked to LIBOR but the other is not.

LIBOR or the London Inter-Bank Offered Rate is the rate of interest applying to wholesale money market lending between London banks.

This makes it unlikely that the two floating rates will move perfectly in line with each other. As one rate increases, the other rate might change by a different amount or might change later.

(b)   **Financial derivatives**

Financial derivatives are **traded products** that have developed from the securities and currency markets. Examples of derivative products include futures and options in currencies and interest rates.

There are two main purposes for which these products might be used:

1   **Hedging against known risks**

This can best be explained by means of an example. The company might have a **commitment** to **make a payment** in a foreign currency on a **specific date in three months' time**. It knows the amount of the sum to be paid in foreign currency, but it cannot know what the exchange rate will be at that time. It therefore faces the risk that if the home currency depreciates against the foreign currency, the size of the payment in sterling will be greater than if the payment were made now. This risk could be **hedged** by using a derivative. Such a transaction would have a **commission cost associated** with it, but it would **limit the risk** faced by the company.

2   **Speculation**

Derivatives can also be used to **gamble** on **expectations of movements** in interest and exchange rates. For example, the investor might believe that sterling would weaken against the dollar, and therefore buy dollars futures. These dollars would then be sold on the spot market once the expected movement in rates had taken place. The transactions are made purely with the **motive of making a profit**, and are not linked to any underlying business transactions. They are therefore very risky.

Since QW has diversified, international interests, derivative products offer **significant benefits** in the management of the financial risks to which the company is exposed. The board needs to determine the level of risk that it is prepared to accept in these areas so that an integrated set of guidelines can be established for the effective management of these issues.

(c)   **Hedging interest rate risk**

The main techniques available to hedge this type of risk are as follows.

Forward rate agreements

A **forward rate agreement** (FRA) is an OTC contract to lend or borrow a given sum of money in the future at an interest rate that is agreed today. For currencies, the equivalent is the **forward contract**: an agreement to buy or sell a given amount of currency in the future at an exchange rate that is agreed today. These contracts can be used to **'fix' interest rates or exchange rates** on future transactions, thus **removing the risk of rate movements** in the intervening period.

Interest rate futures

These operate in a similar way to forward rate agreements. However, they are not negotiated directly with a bank but are **traded on the futures market**. Consequently, the terms, the amounts and the periods are **standardised**. For this reason, forward rate agreements are normally more appropriate than interest rate futures to non-financial companies such as QW.

Interest rate options

An interest rate option provides the **right to borrow or to lend a specified amount at a guaranteed rate of interest**. On the date of expiry of the option, or before, the buyer must decide whether or not to **exercise the right**. Thus in a borrowing situation, the option will only be exercised if market interest rates have risen above the option rate. Tailor made contracts can be purchased from major banks, while standardised contracts are traded in a similar way to interest rate futures. The cost of taking out an option is generally higher than for a forward rate agreement.

Interest rate swaps

These are transactions that exploit different interest rates in different markets for borrowing, to **reduce interest costs** for either fixed or floating rate loans. An interest rate swap is an arrangement whereby two companies, or a company and a bank, **swap interest rate commitments** with each other. In a sense, each simulates the other's borrowings, although each party to the swap retains its obligations to the original lenders. This means that the parties must accept counterparty risk.

The main benefits of a swap as compared with other hedging instruments are as follows.

- **Transaction** costs **are low**, being limited to legal fees
- They are **flexible**, since they can be arranged in any size, and they can be reversed if necessary
- Companies **with different credit ratings** can **borrow at the best cost in the market** that is most accessible to them and then swap this benefit with another company to reduce the mutual borrowing costs
- Swaps allow **capital restructuring** by changing the nature of interest commitments without the need to redeem debt or to issue new debt, thus reducing transaction costs

64 Gorwa Co

Text references. Interest rate risk is covered in Chapter 20, overtrading in Chapter 4 and factoring in Chapter 5.

Top tips. This is a time pressured question and you will need to do the necessary calculations as quickly as possible, making sure you allow sufficient time to write enough explanations and discussion. Use a logical approach and show your workings clearly to gain as many marks as possible in the time available.

Easy marks. There are plenty of easy marks available for some straightforward ratio analysis and the calculation in part (c).

Examiner's comments. Some candidates were not aware of the difference between interest rate and interest payment, and consequently discussed how the company's finance costs (interest payments) had increased from one year to the next. Analysis would have shown that the increase in the finance cost was due to the increase in the overdraft and that the interest rate applied to the overdraft was 5% in each year, ie the interest rate had not changed. The bonds were

fixed-rate in nature, as they were given in the balance sheet as 8% bonds. As the question asked about hedging interest rate risk, looking at the balance between fixed rate debt (bonds) and floating rate debt (overdraft) was

also relevant here, as was a consideration of gearing and interest cover. The question was, in fact, very open in nature, and a discussion of the effects of an increase in interest rates could look at an increase in financial risk, a decrease in sales due to a fall in demand, an increase in operating costs and a cutting back of investment plans.

In part (b), better answers calculated a series of accounting ratios, perhaps adding some growth rates and changes in financial statement entries, and used this analysis to look at the increasing dependence of the company on short-term sources of finance while sales were expanding at a high rate. Weaker answers often did little more than repeat in words the financial ratios that had been already calculated without explaining how or why the identified changes supported the idea that the company was overtrading.

In part (c) many candidates seemed to be unfamiliar with the relationship between credit sales, the level of trade receivables in the balance sheet, trade receivables days (the trade receivables collection period), and the cost of financing trade receivables. This unfamiliarity led to applying the revised trade receivables days to the current level of receivables instead of to credit sales: calculating the factor's advance on the current level of receivables rather than on the revised level of receivables: and calculating the factor's fee on the level of receivables rather than on credit sales.

Since marks were available for each element of the cost-benefit analysis, most candidates were able to obtain reasonable marks on this part even where answers were incomplete or contained some of the errors identified above.

Marking scheme

			Marks
(a)	Discussion of effects of interest rate increase	3-4	
	Relevant financial analysis	1-2	
	Interest rate hedging	2-3	
	Maximum		7
(b)	Financial analysis	5-6	
	Discussion of overtrading	4-5	
	Conclusion as to overtrading	1	
	Maximum		10
(c)	Reduction in financing cost	3	
	Factor's fee	1	
	Interest on advance	2	
	Net cost of factoring	1	
	Conclusion	1	
			8
			25

(a)

	20X7	20X6
	$'000	$'000
8% bonds	2,425	2,425
Overdraft	3,225	1,600
Total debt	5,650	4,025
Proportion of debt that has variable interest		
(1,600/4,025 × 100%)	57%	40%
Overdraft interest payments @ 5%	161	80
Bond interest payments @ 8%	194	194
	355	274
Proportion of interest payments that are variable		
(80/274 × 100%)	45%	29%
Interest coverage ratio		
(2,939/274)	8.4 times	10.7 times
Long-term debt/equity ratio		
(2,425/11,325 × 100%)	20%	21%
Total debt/equity ratio		
(4,025/11,325 × 100%)	45%	36%

Fixed interest debt

The 8% bonds are redeemable in ten years' time and are therefore sufficiently **long-term** to protect Gorwa Co against an increase in interest rates. In 20X6, fixed interest debt constituted 60% of total debt but this fell to 43% in 20X7. The company has therefore become **more exposed** to interest rate fluctuations.

Financial risk

The **interest coverage ratio** has fallen from 10.7 times to 8.4 times and this will be a problem if this trend continues.

Gearing has increased from 36% to 45%, if we look at the debt/equity ratio including the overdraft. Gearing has fallen slightly if we ignore the overdraft, but it is sufficiently large to justify its inclusion in the calculation.

These two ratios indicate that **financial risk** has increased and an increase in interest rates will worsen the situation further. The proportion of interest arising from variable rate debt has already risen from 29% to 45% and an increase in interest rates would further reduce profit before taxation and therefore interest coverage.

Protection against interest rate risk

Interest rate risk relates to the sensitivity of profit and cash flows to changes in interest rates. Variable rate debt increases the **volatility of cash flows**; therefore a **switch into long-term fixed rate debt** would reduce this risk. However, long-term debt tends to be **more expensive** than short-term debt, assuming a normal yield curve. If interest rates fall sharply, Gorwa Co could suffer a loss of **competitive advantage** compared with companies using floating rate borrowing whose interest rates and cost of capital will fall.

Gorwa Co could consider the use of **interest rate derivatives** such as **options** and **futures** in the short-term to limit its exposure to adverse interest rate movements. A **forward rate agreement** could also be considered which would fix the interest rate on future borrowing.

(b) **Overtrading**

Overtrading happens when a business tries to **do too much too quickly** with **too little long-term capital**, so that it is trying to support too large a volume of trade with the capital resources at its disposal.

Even if an overtrading business operates at a profit, it could easily run into serious trouble because it is **short of money**. Such liquidity troubles stem from the fact that it does not have enough capital to provide the cash to pay its debts as they fall due.

	20X7	*20X6*
Inventory days	$4,600/34,408 \times 365 = 49$ days	$2,400/23,781 \times 365 = 37$ days
Receivables days	$4,600/37,400 \times 365 = 45$ days	$2,200/26,720 \times 365 = 30$ days
Payables days	$4,750/34,408 \times 365 = 50$ days	$2,000/23,781 \times 365 = 31$ days
Current ratio	$9,200/7,975 = 1.15$ times	$4,600/3,600 = 1.28$ times
Quick ratio	$4,600/7,975 = 0.58$ times	$2,200/3,600 = 0.61$ times
Sales/net working capital	$37,400/(9,200 - 7,975) = 30.53$ times	$26,720/(4,600 - 3,600) = 26.72$ times

Increase in sales	$(37,400 - 26,720)/26,720 \times 100\% = 40\%$
Increase in non-current assets	$(13,632 - 12,750)/12,750 \times 100\% = 7\%$
Increase in inventory	$(4,600 - 2,400)/2,400 \times 100\% = 92\%$
Increase in receivables	$(4,600 - 2,200)/2,200 \times 100\% = 109\%$
Increase in payables	$(4,750 - 2,000)/2,000 \times 100\% = 138\%$
Increase in overdraft	$(3,225 - 1,600)/1,600 \times 100\% = 102\%$

Symptoms of overtrading are as follows.

A rapid increase in turnover

Gorwa Co has experienced a 40% increase in turnover from 20X6 to 20X7 and working capital has not increased in line. The sales/net working capital ratio has increased from 26.72 times to 30.53 times.

A rapid increase in the volume of current assets

Inventories have increased by 92% and receivables by 109%. **Inventory turnover** and **accounts receivable turnover** have slowed down so the rate of increase in inventories and accounts receivable has been even greater than the rate of increase in sales. Inventory may have been stockpiled in anticipation of a further

increase in turnover. The increase in sales could have partly arisen due to a relaxation of credit terms for receivables.

Most of the increase in assets is financed by credit

The payment period for **accounts payable** has lengthened from 31 days to 50 and there has been an overall increase of 138% in payables. The **bank overdraft** has also increased by 102%.

Falling liquidity ratios

Both the **current ratio** and the **quick ratio** have deteriorated.

Conclusion

There is clear evidence that Gorwa Co is overtrading. It would be helpful to have **benchmark information** such as key ratios from similar companies and more information from **prior years** to see if there is definitely a trend.

(c) **Benefits**

Current receivables = $4,600,000

Receivables under factor = $37,400,000 × 30/365 = $3,073,973

Reduction in receivables = $4,600,000 − $3,073,973 = $1,526,027

Reduction in finance cost = 1,526,027 × 5% = $76,301 per year

Administration cost savings = $100,000 per year

Bad debt savings = $350,000 per year

Costs

Factor's annual fee =$ 37,400,000 × 3% = $1,122,000 per year

Extra interest cost on advance = $3,073,973 × 80% × (7% − 5%) = $49,184 per year

The proposal to factor trade receivables is **not financially acceptable** as there is a net cost of $644,883.