Answers

1 (a) Calculation of NPV

Year	1	2	3	4	5
	$000	$000	$000	$000	$000
Sales income	5,670	6,808	5,788	6,928	
Variable cost	(3,307)	(4,090)	(3,514)	(4,040)	
Contribution	2,363	2,718	2,274	2,888	
Fixed cost	(776)	(803)	(832)	(861)	
Cash flow before tax	1,587	1,915	1,442	2,027	
Tax at 28%		(444)	(536)	(404)	(568)
Depreciation tax benefit		350	263	197	479
Cash flow after tax	1,587	1,821	1,169	1,820	(89)
Scrap value				400	
Net cash flow	1,587	1,821	1,169	2,220	(89)
Discount at 13%	0·885	0·783	0·693	0·613	0·543
Present values	1,405	1,426	810	1,361	(48)

	$000
Sum of present values	4,954
Initial investment	5,000
Net present value	(46)

Although the NPV of the project is negative and so financially it is not acceptable, the Board of OAP Co have decided that it must be undertaken as it strategically important.

Workings

Year	1	2	3	4
Selling price ($/unit)	450	475	500	570
Inflated selling price ($/unit)	472·50	523·69	578·81	692·84
Sales volume (units/year)	12,000	13,000	10,000	10,000
Sales income ($000/year)	5,670	6,808	5,788	6,928

Year	1	2	3	4
Variable cost ($/unit)	260	280	295	320
Inflated variable cost ($/unit)	275·60	314·61	351·35	403·99
Sales volume (units/year)	12,000	13,000	10,000	10,000
Variable cost ($000/year)	3,307	4,090	3,514	4,040

Year	Tax allowable depreciation	Tax benefit
1	5,000,000 x 0·25 = $1,250,000	1,250,000 x 0·28 = $350,000
2	3,750,000 x 0·25 = $937,500	937,500 x 0·28 = $262,500
3	2,812,500 x 0·25 = $703,125	703,125 x 0·28 = $196,875
4	1,709,375*	1,709,375 x 0·28 = $478,625

*5,000,000 – 1,250,000 – 937,500 – 703,125 – 400,000

Alternative calculation of cash flow after tax

Year	1	2	3	4	5
	$000	$000	$000	$000	$000
Cash flow before tax	1,587	1,915	1,442	2,027	
Tax allowable depreciation	(1,250)	(937·5)	(703)	(1,709)	
Taxable profit	337	977·5	739	318	
Tax at 28%		(94)	(274)	(207)	(89)
Tax allowable depreciation	1,250	937·5	703	1,709	
Cash flow after tax	1,587	1,821	1,168	1,820	(89)

(b) **Calculation of maximum NPV**

Project	A	B	C	D	E
Investment ($000)	2,500	2,200	2,600	1,900	5,000
NPV ($000)	1,000	1,550	1,350	1,500	nil
PV of future cash flows	3,500	3,750	3,950	3,400	5,000
Profitability index	1·400	1·705	1·519	1·789	1·000
Ranking	4		3	2	1

Project E has been ranked first as it must be undertaken. Project B cannot be undertaken if Project D is undertaken, as the two projects are mutually exclusive.

Calculation of maximum NPV

	Investment ($000)	NPV ($000)
Project E	5,000	nil
Project D	1,900	1,500
Project C	2,600	1,350
Project A	500	200
	10,000	3,050

As Project A is divisible and only $500,000 (20%) of its $2,500,000 initial cost is available after cumulative investment in Projects E, D and C, the NPV from the project is $200,000 (20% of $1,000,000).

(c) When a company restricts or limits investment funds, it is undertaking 'soft' or internal capital rationing. Capital rationing means that a company is unable to invest in all projects with a positive net present value and hence it is not acting to maximise shareholder wealth.

There are several reasons why the Board of OAP Co may have decided to limit investment funds for the next year. It may not wish to issue new equity finance in order to avoid diluting earning per share. Issuing new equity finance may also increase the risk of a company's shares being bought by a potential acquirer, leading to a future takeover bid.

The Board of OAP Co may not wish to issue new debt finance if it wishes to avoid increasing its commitment to fixed interest payments. This could be because economic prospects are seen as poor or challenging, or because existing debt obligations are high and so the Board does not wish to increase them.

The Board of OAP Co may wish to follow a strategy of organic growth, financing capital investment projects from retained earnings rather than seeking additional external finance.

The Board of OAP Co may wish to create an internal market for capital investment funds, so that capital investment proposals must compete for the limited funds made available in the budget set by the Board. This competition would mean that only robust capital investment projects would be funded, while marginal capital investment projects would be rejected.

2 **(a)** Inventory days = 365 x (5,700/26,000) = 80 days
Trade receivables days = 365 x (6,575/40,000) = 60 days
Trade payables days = 365 x (2,137/26,000) = 30 days
Working capital cycle of CSZ Co = 80 + 60 – 30 = 110 days

The working cycle of CSZ Co is positive and the company pays its trade suppliers 110 days (on average) before it receives cash from its customers. This represents a financing need as far as CSZ Co is concerned, which could be funded from a short-term or long-term source.

If the working capital cycle had been negative, CSZ Co would have been receiving cash from its customers before it needed to pay its trade suppliers. A company which does not give credit to its customers, such as a supermarket chain, can have a negative working capital cycle.

Even if companies might generally prefer to be paid by customers before they have to pay their suppliers, the question of whether the working capital cycle should be positive or negative implies that companies are able to make such a choice, but this is not usually the case. This is because the length of the working capital cycle depends on its elements, which are inventory days, trade receivables days and trade payables, and these elements usually depend on the nature of the business undertaken by a company and the way that business is conducted by its competitors. The length of the working capital cycle is usually therefore similar between companies in the same business sector, but can differ between business sectors.

(b) At the end of March 2015:

Cost of sales = 40,000,000 x 0·6 = $24,000,000

Inventory using target inventory days = 24,000,000 x 60/365 = $3,945,206

Trade receivables using target trade receivables days = 40,000,000 x 75/365 = $8,219,178

Current assets = 3,945,206 + 8,219,178 = $12,164,384

If the target current ratio is 1·4 times, current liabilities = 12,164,384/1·4 = $8,688,846

The target quick ratio (acid test ratio) = 8,219,178/8,688,846 = 0·95 times

Net current assets at the end of March 2015 = 12,164,384 – 8,688,846 = $3,475,538
Target sales/net working capital ratio = 40,000,000/3,475,538 = 11·5 times

(c) The current liabilities at the end of March 2015, calculated in part (b), can be divided into trade payables and the forecast overdraft balance.

Trade payables using target trade payables days = 24,000,000 x 55/365 = $3,616,438.

The overdraft (balancing figure) = 8,688,846 – 3,616,438 = $5,072,408

Comparing current assets and current liabilities:

	March 2014		March 2015	
	$000	$000	$000	$000
Inventory	5,700		3,945	
Trade receivables	6,575	12,275	8,219	12,164
Trade payables	2,137		3,616	
Overdraft	4,682	6,819	5,072	8,688
Net current assets		5,456		3,476

The overdraft as a percentage of current liabilities will fall from 69% (4,682/6,819) to 58% (5,072/8,688). Even though the overdraft is expected to increase by 8·3%, current liabilities are expected to increase by 27·4% (8,688/6,819). Most of this increase is expected to be carried by trade payables, which will rise by 69·2% (3,616/2,137), with trade payables days increasing from 30 days to 55 days.

At the end of March 2014, current liabilities were 56% of current assets (100 x 6,819/12,275), suggesting that 44% of current assets were financed from a long-term source. At the end of March 2015, current liabilities are expected to be 71% of current assets (100 x 8,688/12,164), suggesting that 29% of current assets are financed from a long-term source. This increasing reliance on short-term finance implies an aggressive change in the working capital financing policy of CSZ Co.

(d) Transaction risk relates to foreign currency transactions which are short-term in nature, such as payments expected by a company from foreign trade receivables, payments made by a company in settling foreign trade payables, and interest payments made by a company on foreign currency-denominated debt. Transaction risk can be managed by several internal methods.

Currency of invoice
One internal hedging method is for a company to invoice foreign customers in its domestic currency, thereby transferring the foreign currency risk to the foreign customers. This method is usually not commercially viable, however, as foreign customers will transfer their business to competitors who do invoice in the foreign currency, thereby avoiding the foreign currency risk.

Matching
The risk arising from foreign currency receipts and payments can be managed by matching. Receipts and payments in the same foreign currency can be matched, for example, by using a foreign currency bank account, so that there is no need to buy the foreign currency. Taking a longer-term view, assets and liabilities can be matched in order to hedge foreign currency risk. For example, a company expecting regular foreign currency income can use debt in the same currency to meet a financing need, so that the foreign currency interest on the debt can be met from the foreign currency income.

Leading and lagging
Transaction risk can be managed by leading and lagging, where foreign currency payments could be made in advance (leading) or in arrears (lagging), depending on the view of the paying company as to whether the currency of payment was expected to appreciate or depreciate against the domestic currency. Lagged payments to accounts payable should not exceed the credit period agreed with the supplier, however.

3 (a) Cost of equity
The current cost of equity can be calculated using the capital asset pricing model.

Equity or market risk premium = 11 – 4 = 7%
Cost of equity = 4 + (0·9 x 7) = 4 + 6·3 = 10·3%

After-tax cost of debt
After-tax interest payment = 100 x 0·07 x (1 – 0·2) = $5·60 per bond

Year	Cash flow	$	5% discount	PV ($)	4% discount	PV ($)
0	market value	(107·14)	1·000	(107·14)	1·000	(107·14)
1–7	interest	5·60	5·786	32·40	6·002	33·61
7	redemption	100·00	0·711	71·10	0·760	76·00
				(3·64)		2·47

After-tax cost of debt = IRR = 4 + ((5 – 4) x 2·47)/(2·47 + 3·64) = 4 + 0·4 = 4·4%

Market value of equity = 10,000,000 x 7·50 =$75 million
Market value of Fence Co debt = 14 million x 107·14/100 = $15 million
Total market value of company = 75 + 15 = $90 million

WACC = ((10·3 x 75) + (4·4 x 15))/90 = 9·3%

(b) Since the investment project is different to business operations, its business risk is different to that of existing operations. A cost of equity for appraising it can be therefore be found using the capital asset pricing model.

Ungearing proxy company equity beta
Asset beta = 1·2 x 54/(54 + (12 x 0·8)) = 1·2 x 54/63·6 = 1·019

Regearing asset beta
Market value of debt = $15m (calculated in part (a))
Regeared asset beta = 1·019 x (75 + (15 x 0·8))/75 = 1·019 x 87/75 = 1·182

Using the CAPM
Equity or market risk premium = 11 – 4 = 7%
Cost of equity = 4 + (1·182 x 7) = 4 + 8·3 = 12·3%

(c) Portfolio theory suggests that the total risk of a portfolio of investments can be reduced by diversifying the investments held in the portfolio, e.g. by investing capital in a number of different shares rather than buying shares in only one or two companies.

Even when a portfolio has been well-diversified over a number of different investments, there is a limit to the risk-reduction effect, so that there is a level of risk which cannot be diversified away. This undiversifiable risk is the risk of the financial system as a whole, and so is referred to as systematic risk or market risk. Diversifiable risk, which is the element of total risk which can be reduced or minimised by portfolio diversification, is referred to as unsystematic risk or specific risk, since it relates to individual or specific companies rather than to the financial system as a whole.

Portfolio theory is concerned with total risk, which is the sum of systematic risk and unsystematic risk. The capital asset pricing model assumes that investors hold diversified portfolios, and so is concerned with systematic risk alone.

(d) Capital market efficiency is concerned with pricing efficiency when weak form, semi-strong form and strong form efficiency are being discussed. In relation to pricing efficiency, the efficient markets hypothesis (EMH) suggests that share prices fully and fairly reflect all relevant and available information. Relevant and available information can be divided into past information, public information and private information.

Weak form efficiency
This form of pricing efficiency arises when share prices fully and fairly reflect all past share price movements. Past share price movements cannot therefore be used to predict future share prices in order to make an abnormal gain and share prices appear to follow a random walk, with share prices responding to new information as this arrives on the capital market.

Semi-strong form efficiency
This form of pricing efficiency arises when share prices fully and fairly reflect all relevant and available public information, which includes all past information. Public information cannot therefore be used to make an abnormal gain, since capital markets and share prices quickly and accurately respond to new information. Well-developed capital markets are held to be semi-strong form efficient.

Strong form efficiency
This form of pricing efficiency arises when share prices fully and fairly reflect all private information as well as public information. When capital markets are strong form efficient, no-one can make abnormal returns, even investors who possess private or insider information. This level of pricing efficiency is not found in the real world, which is why governments legislate against insider dealing.

Significance of EMH to financial managers
If the EMH is correct and share prices are fair, there is no point in financial managers seeking to mislead the capital market, because such attempts will be unsuccessful. Window-dressing financial statements, for example, in order to show a company's performance and position in a favourable light, will be seen through by financial analysts as the capital market digests the financial statement information in pricing the company's shares.

Another consequence of the EMH for financial managers is that there is no particular time which is best for issuing new shares, as share prices on the stock market are always fair.

Because share prices are always fair, there are no bargains to be found on the stock market, i.e. companies whose shares are undervalued. An acquisition strategy which seeks to identify and exploit such stock market bargains is pointless if the EMH is correct.

It should be noted, however, that if real-world capital markets are semi-strong form efficient rather than strong form efficient, insider information may undermine the strength of the points made above. For example, a company which is valued fairly by the stock market may be undervalued or overvalued if private or insider information is taken into account.

4 (a) Objective 1

MFZ Co has stated an objective to achieve growth in profit before interest and tax of 4% per year. Analysis shows that profit before interest and tax growth was 3·4% in 2014 (18·3m/17·7m) and 3·5% in 2013 (17·7m/17·1m). MFZ Co has therefore not achieved this objective in either year.

Objective 2

Year	2014	2013	2012
Profit after tax	$12·8m	$12·4m	$12·0m
Number of shares	12m	12m	12m
Earnings per share	106·67c	103·33c	100·00c
Annual growth	3·2%	3·3%	

MFZ Co has stated an objective to achieve growth in earnings per share of 3·5% per year. Analysis shows that growth in earnings per share was 3·2% in 2014 (106·67c/103·33c) and 3·3% in 2013 (103·33c/100·00c). MFZ Co has therefore not achieved this objective in either year.

Objective 3

MFZ Co has stated an objective to achieve growth in total shareholder return (TSR) of 5% per year. Analysis shows that growth in TSR was 11·4% in 2014 and 11·7% in 2013. MFZ Co has therefore achieved this objective in both 2014 and 2013.

Year	2014	2013	2012
Equity market value	$56·4m	$55·2m	$54·0m
Number of shares	12m	12m	12m
Share price	$4·70	$4·60	$4·50
Dividends	$5·1m	$5·1m	$4·8m
Number of shares	12m	12m	12m
Dividend per share	42·5c	42·5c	40·0c

On a per share basis:
2014 TSR = 100 x (470 – 460 + 42·5)/460 = 11·4%
2013 TSR = 100 x (460 – 450 + 42·5)/450 = 11·7%

Alternatively, using total values:

2014 TSR = 100 x (56·4m – 55·2m + 5·1m)/55·2m = 11·4%
2013 TSR = 100 x (55·2m – 54·0m + 5·1m)/54·0m = 11·7%

(b) Historical dividends per share have been 42·5c (2014), 42·5c (2013) and 40·0c (2012). There has therefore been zero growth in dividend per share in 2014, 6·25% growth in dividend per share in 2013, and an average dividend growth rate of 3·1% over the two-year period from 2012 to 2014. The same result could be found by considering total dividend paid rather than dividend per share, since the number of shares has been constant over the two-year period. If historical dividend per share growth is assumed to be an indication of future dividend per share growth, it seems reasonable to use a dividend growth rate of 3·1% or zero in the dividend growth model (DGM).

Using zero future dividend growth, the 2014 share price using the DGM will be $3·54 per share (42·5/0·12) and the 2014 total equity market value will be $42·48m ($3·54 x 12m).

Using 3·1% dividend growth, the 2014 share price using the DGM will be $4·92 per share ((42·5 x 1·031)/(0·12 – 0·031)) and the 2014 total equity market value will be $59·04m ($4·92 x 12m).

The 2014 equity market value on the capital market is $56·4m. This is higher than the DGM value using zero future dividend growth and lower than the DGM value using 3·1% dividend growth. One reason for the difference between the 2014 equity market value and the values predicted by the DGM is that the capital market expects future growth in dividends to be different from the assumed value used in the DGM, e.g. slightly less than 3·1%.

The future cost of equity of MFZ Co may also differ from the current cost of equity of 12% used in the DGM calculation and the current market price may reflect an expectation of a future change in the cost of equity.

(c) Cash needed for investment = $9·2 million
Cash to be raised = $9·2m + issue costs = $9·2m + $0·2m = $9·4 million

Current share price = $56·4m/12m = $4·70 per share
Rights issue price = 4·70 x 0·8 = $3·76 per share

New shares to be issued = 9·4m/3·76 = 2·5 million shares
Total number of shares after issue = 12m + 2·5m = 14·5 million shares

Theoretical ex rights price = [(12m x 4·70) + (2·5m x 3·76) – 0·2m]/14·5m = $4·52 per share

Alternatively, theoretical ex rights price = ($56·4m + $9·2m)/14·5m = $4·52 per share

(d) There are a number of sources of long-term debt finance which may be available to a listed company such as MFZ Co, with a variety of characteristics.

Long-term bank loan

MFZ Co could obtain the $9·2m which it needs for investment purposes via a bank loan, from either a single bank or from a syndicate of banks. Interest payments on the bank loan could be annual, twice yearly or quarterly, and at either a fixed rate or a floating rate of interest. Repayments of capital may be required along with interest payments and it is possible that a constant cash amount would be regularly paid, with the amount of interest in the payment declining and the amount of capital in the payment increasing over time. It is likely that the bank loan would be secured against particular non-current assets of MFZ Co, so that the bank could recover its loan if the company defaults on interest payments.

Bonds or loan notes

Bonds or loan notes may be redeemable or irredeemable (permanent), although in recent years irredeemable corporate bonds have been very rare. Fixed rate or floating rate interest is paid on the bonds, either annually or half yearly, with the interest being based on nominal (par) value of the bonds rather than on their market value. Bonds, like ordinary shares, are mainly traded on the capital markets and can be issued in a variety of foreign currencies. Redemption of a large bond issue can pose a serious cash flow problem for a company and may call for refinancing rather than outright redemption. The return required on debt finance (the cost of debt) is lower than the return required on equity (the cost of equity), and so MFZ Co could reduce its average cost of capital by issuing debt finance, as it is currently financed by equity alone.

Convertible bonds or loan notes

Convertible bonds or loan notes are bonds which, at the option of the holder, can be converted into a specified quantity of ordinary shares (the conversion ratio) on a specified future date (the conversion date). They have the advantage for the issuing company that, assuming conversion terms are set appropriately, conversion will occur and so redemption can be avoided. If conversion occurs, there can be a significant reduction in the gearing of the issuing company. The future option to convert into equity has value to investors and as a consequence, the interest rate on convertible debt is lower than that on ordinary bonds. Convertible bonds can pay interest annually or twice annually, at a fixed or a floating rate of interest. If conversion does not take place, however, redemption of the bonds or loan notes will be required.

Deep discount bonds and zero coupon bonds

The return to a bond holder consists of regular interest payments (income) and repayment of the principle amount on redemption (capital). Investors may accept lower interest payments (lower income) in exchange for an increase in capital return. This can be achieved if the bond is issued at a deep discount to nominal value, but redeemed at nominal value. This kind of financial security is called a deep discount bond and may be suitable for companies which do not expect an immediate return on invested capital. A zero coupon bond goes a step further and pays no interest (coupon) at all, so that the return to the investor is entirely in the form of capital appreciation. Bonds like these are useful for companies which expect cash flows from invested capital to occur mainly later in the life of an investment project, rather than more evenly throughout its life.

			Marks	*Marks*
1	**(a)**	Sales income	1	
		Inflation of sales income	1	
		Variable cost	1	
		Inflation of variable cost	1	
		Inflated fixed costs	1	
		Tax liability	1	
		Timing of tax liability	1	
		Tax allowable depreciation years 1 to 3	1	
		Balancing allowance	1	
		Tax allowable depreciation tax benefits	1	
		Scrap value	1	
		Calculation of present values	1	
		Calculation of NPV	1	
		Comment on financial acceptability	1	
				14
	(b)	Calculation of profitability indices	1	
		Ranking by profitability indices	1	
		Allocation of funds to Project E	1	
		Calculation of *pro rata* NPV on partial project	1	
		Calculation of maximum NPV	1	
				5
	(c)	Reasons for not raising equity finance	2–3	
		Reasons for not raising debt finance	2–3	
		Other relevant discussion	1–2	
			Maximum	6
				25

			Marks	*Marks*
2	**(a)**	Inventory days	0·5	
		Trade receivables days	0·5	
		Trade payables days	0·5	
		Working capital cycle	0·5	
		Discussion of working capital cycle	4	
				6
	(b)	Cost of sales	0·5	
		Inventory	0·5	
		Trade receivables	0·5	
		Current assets	0·5	
		Current liabilities	0·5	
		Target quick ratio	1	
		Net working capital	0·5	
		Target sales/net working capital ratio	1	
				5
	(c)	Trade payables	1	
		Overdraft	1	
		Analysis of current asset and liability positions	1–3	
		Comparison of current asset and liability positions	1–3	
		Discussion of change in financing policy	1–3	
			Maximum	8
	(d)	Transaction risk	1	
		Currency of invoice	1–2	
		Matching	1–2	
		Leading and lagging	1–2	
			Maximum	6
				25
3	**(a)**	Calculation of equity risk premium	1	
		Calculation of cost of equity	1	
		After-tax interest payment	1	
		Setting up IRR calculation	1	
		Calculating after-tax cost of debt	1	
		Market value of equity	0·5	
		Market value of debt	0·5	
		Calculating WACC	1	
				7
	(b)	Ungearing proxy company equity beta	2	
		Regearing equity beta	1	
		Calculation of cost of equity	1	
				4
	(c)	Risk diversification	1–2	
		Systematic risk	1–2	
		Unsystematic risk	1–2	
		Portfolio theory and the CAPM	1–2	
			Maximum	6
	(d)	Nature of capital market efficiency	1–2	
		Weak form efficiency	1–2	
		Semi-strong form efficiency	1–2	
		Strong form efficiency	1–2	
		Significance of EMH for financial manager	2–3	
			Maximum	8
				25

			Marks	*Marks*
4	**(a)**	Calculations of PBIT growth	1	
		Comment on PBIT growth	1	
		Calculations of EPS growth	1	
		Comment on EPS growth	1	
		2014 total shareholder return	1	
		2013 total shareholder return	1	
		Comment on TSR growth	1	
				7
	(b)	Calculation of historical dividend growth rate	1	
		Total equity market value using DGM	2	
		Discussion of DGM value and equity market value	2	
				5
	(c)	Cash to be raised	1	
		Rights issue price	1	
		New shares issued	1	
		Theoretical ex rights price per share	2	
				5
	(d)	Long-term bank loan	1–2	
		Bonds or loan notes	1–2	
		Convertible bonds or loan notes	1–2	
		Deep discount bonds and zero coupon bonds	1–2	
		Other relevant discussion	1–2	
			Maximum	8
				25