# Answers

## Fundamentals Level – Skills Module, Paper F9 Financial Management

1 (a) (i) Price/earnings ratio method valuation Earnings per share of Danoca Co = 40cAverage sector price/earnings ratio = 10Implied value of ordinary share of Danoca Co =  $40 \times 10 = $4.00$ Number of ordinary shares = 5 million Value of Danoca Co =  $4.00 \times 5m = $20$  million (ii) Dividend growth model Earnings per share of Danoca Co = 40cProposed payout ratio = 60%Proposed dividend of Danoca Co is therefore =  $40 \times 0.6 = 24c$  per share If the future dividend growth rate is expected to continue the historical trend in dividends per share, the historic dividend growth rate can be used as a substitute for the expected future dividend growth rate in the dividend growth model. Average geometric dividend growth rate over the last two years =  $(24/22)^{1/2} = 1.045$  or 4.5%(Alternatively, dividend growth rates over the last two years were 3% (24/23·3) and 6% (23·3/22), with an arithmetic average of (6 + 3)/2 = 4.5%) Cost of equity of Danoca Co using the capital asset pricing model (CAPM)  $= 4.6 + 1.4 \times (10.6 - 4.6) = 4.6 + (1.4 \times 6) = 13\%$ Value of ordinary share from dividend growth model =  $(24 \times 1.045)/(0.13 - 0.045) = $2.95$ Value of Danoca Co =  $2.95 \times 5m = $14.75$  million The current market capitalisation of Danoca Co is \$16.5m (\$3.30 x 5m). The price/earnings ratio value of Danoca Co is higher than this at \$20m, using the average price/earnings ratio used for the sector. Danoca's own price/earnings ratio is 8.25. The difference between the two price/earnings ratios may indicate that there is scope for improving the financial performance of Danoca Co following the acquisition. If Phobis Co has the managerial skills to effect this improvement, the company and its shareholders may be able to benefit as a result of the acquisition. The dividend growth model value is lower than the current market capitalisation at \$14.75m. This represents a minimum value that Danoca shareholders will accept if Phobis Co makes an offer to buy their shares. In reality they would want more than this as an inducement to sell. The current market capitalisation of Danoca Co of \$16m may reflect the belief of the stock market that a takeover bid for the company is imminent and, depending on its efficiency, may indicate a fair price for Danoca's shares, at least on a marginal trading basis. Alternatively, either the cost of equity or the expected dividend growth rate used in the dividend growth model calculation could be inaccurate, or the difference between the two values may be due to a degree of inefficiency in the stock market. (b) Calculation of market value of each convertible bond Expected share price in five years' time =  $4.45 \times 1.065^5 = \$6.10$ Conversion value =  $6 \cdot 10 \times 20 =$ \$122 Compared with redemption at par value of \$100, conversion will be preferred The current market value will be the present value of future interest payments, plus the present value of the conversion value, discounted at the cost of debt of 7% per year. Market value of each convertible bond =  $(9 \times 4.100) + (122 \times 0.713) = $123.89$ Calculation of floor value of each convertible bond

The current floor value will be the present value of future interest payments, plus the present value of the redemption value, discounted at the cost of debt of 7% per year.

Floor value of each convertible bond =  $(9 \times 4.100) + (100 \times 0.713) = $108.20$ 

Calculation of conversion premium of each convertible bond Current conversion value =  $4.45 \times 20 = \$89.00$ Conversion premium = \$123.89 - 89.00 = \$34.89This is often expressed on a per share basis, i.e. 34.89/20 = \$1.75 per share

(c) Stock market efficiency usually refers to the way in which the prices of traded financial securities reflect relevant information. When research indicates that share prices fully and fairly reflect past information, a stock market is described as weak-form efficient. Investors cannot generate abnormal returns by analysing past information, such as share price movements in previous time periods, in such a market, since research shows that there is no correlation between share price movements in successive periods of time. Share prices appear to follow a 'random walk' by responding to new information as it becomes available.

When research indicates that share prices fully and fairly reflect public information as well as past information, a stock market is described as semi-strong form efficient. Investors cannot generate abnormal returns by analysing either public information, such as published company reports, or past information, since research shows that share prices respond quickly and accurately to new information as it becomes publicly available. If research indicates that share prices fully and fairly reflect not only public information and past information, but private information as well, a stock market is described as strong form efficient. Even investors with access to insider information cannot generate abnormal returns in such a market. Testing for strong form efficiency is indirect in nature, examining for example the performance of expert analysts such as fund managers. Stock markets are not held to be strong form efficient.

The significance to a listed company of its shares being traded on a stock market which is found to be semi-strong form efficient is that any information relating to the company is quickly and accurately reflected in its share price. Managers will not be able to deceive the market by the timing or presentation of new information, such as annual reports or analysts' briefings, since the market processes the information quickly and accurately to produce fair prices. Managers should therefore simply concentrate on making financial decisions which increase the wealth of shareholders.

## 2 (a) Net present value evaluation of investment

After-tax weighted average cost of capital =  $(11 \times 0.8) + (8.6 \times (1 - 0.3) \times 0.2) = 10\%$ 

0	8	•			
Year	1 \$000	2 \$000	3 \$000	4 \$000	5 \$000
Contribution Fixed costs	440 (240)	550 (260)	660 (280)	660 (300)	\$000
Taxable cash flow Taxation CA tax benefits Scrap value	200	290 (60) 60	380 (87) 45	360 (114) 34 30	(108) 92
After-tax cash flows Discount at 10%	200 0·909	290 0·826	338 0·751	310 0·683	(16) 0·621
Present values	182	240	254	212	(10)
Present value of benefits Initial investment		<b>\$000</b> 878 800			
Net present value		78			

The net present value is positive and so the investment is financially acceptable. However, demand becomes greater than production capacity in the fourth year of operation and so further investment in new machinery may be needed after three years. The new machine will itself need replacing after four years if production capacity is to be maintained at an increased level. It may be necessary to include these expansion and replacement considerations for a more complete appraisal of the proposed investment.

A more complete appraisal of the investment could address issues such as the assumption of constant selling price and variable cost per kilogram and the absence of any consideration of inflation, the linear increase in fixed costs of production over time and the linear increase in demand over time. If these issues are not addressed, the appraisal of investing in the new machine is likely to possess a significant degree of uncertainty.

### Workings

Annual contribution Year	1	2	3	4
Excess demand (kg/yr)	400,000	500,000	600,000	700,000
New machine output (kg/yr)	400,000	500,000	600,000	600,000
Contribution (\$/kg)	1.1	1.1	1.1	1.1
Contribution (\$/yr)	440,000	550,000	660,000	660,000

Capital allowance (CA) tax benefits

Year	Capital allowanc	e (\$) T	ax benefit (	\$)
1	200,000	(800,000 x 0·25)	60,000	(0·3 x 200,000)
2	150,000	(600,000 x 0·25)	45,000	(0·3 x 150,000)
3	112,500	(450,000 x 0·25)	33,750	(0·3 x 112,500)
	462,500 30,000	(scrap value)		
4	492,500 307,500	(by difference)	92,250	(0·3 x 307,500)
	800,000			

## (b) Internal rate of return evaluation of investment

Year	1 \$000	2 \$000	3 \$000	4 \$000	5 \$000
After-tax cash flows	200	290	338	310	(16)
Discount at 20%	0.833	0.694	0.579	0.482	0.402
Present values	167	201	196	149	(6)
		\$000			
Present value of benefits		707			
Initial investment		800			
Net present value		(93)			

Internal rate of return =  $10 + [((20 - 10) \times 78)/(78 + 93)] = 10 + 4.6 = 14.6\%$ 

The investment is financially acceptable since the internal rate of return is greater than the cost of capital used for investment appraisal purposes. However, the appraisal suffers from the limitations discussed in connection with net present value appraisal in part (a).

(c) Risk refers to the situation where probabilities can be assigned to a range of expected outcomes arising from an investment project and the likelihood of each outcome occurring can therefore be quantified. Uncertainty refers to the situation where probabilities cannot be assigned to expected outcomes. Investment project risk therefore increases with increasing variability of returns, while uncertainty increases with increasing project life. The two terms are often used interchangeably in financial management, but the distinction between them is a useful one.

Sensitivity analysis assesses how the net present value of an investment project is affected by changes in project variables. Considering each project variable in turn, the change in the variable required to make the net present value zero is determined, or alternatively the change in net present value arising from a fixed change in the given project variable. In this way the key or critical project variables are determined. However, sensitivity analysis does not assess the probability of changes in project variables and so is often dismissed as a way of incorporating risk into the investment appraisal process.

Probability analysis refers to the assessment of the separate probabilities of a number of specified outcomes of an investment project. For example, a range of expected market conditions could be formulated and the probability of each market condition arising in each of several future years could be assessed. The net present values arising from combinations of future economic conditions could then be assessed and linked to the joint probabilities of those combinations. The expected net present value (ENPV) could be calculated, together with the probability of the worst-case scenario and the probability of a negative net present value. In this way, the downside risk of the investment could be determined and incorporated into the investment decision.

3 (a) Echo Co paid a total dividend of \$2 million or 20c per share according to the income statement information. An increase of 20% would make this \$2.4 million or 24c per share and would reduce dividend cover from 3 times to 2.5 times. It is debatable whether this increase in the current dividend would make the company more attractive to equity investors, who use a variety of factors to inform their investment decisions, not expected dividends alone. For example, they will consider the business and financial risk associated with a company when deciding on their required rate of return.

It is also unclear what objective the finance director had in mind when suggesting a dividend increase. The primary financial management objective is the maximisation of shareholder wealth and if Echo Co is following this objective, the dividend will already be set at an optimal level. From this perspective, a dividend increase should arise from increased maintainable profitability, not from a desire to 'make the company more attractive'. Increasing the dividend will not generate any additional capital for Echo Co, since existing shares are traded on the secondary market.

Furthermore, Miller and Modigliani have shown that, in a perfect capital market, share prices are independent of the level of dividend paid. The value of the company depends upon its income from operations and not on the amount of this income which is paid out as dividends. Increasing the dividend would not make the company more attractive to equity investors, but would attract equity investors who desired the new level of dividend being offered. Current shareholders who were satisfied by the current dividend policy could transfer their investment to a different company if their utility had been decreased.

The proposal to increase the dividend should therefore be rejected, perhaps in favour of a dividend increase in line with current dividend policy.

(b) The proposal to raise \$15 million of additional debt finance does not appear to be a sensible one, given the current financial position of Echo Co. The company is very highly geared if financial gearing measured on a book value basis is considered. The debt/equity ratio of 150% is almost twice the average of companies similar to Echo Co. This negative view of the financial risk of the company is reinforced by the interest coverage ratio, which at only four times is half that of companies similar to Echo Co.

Raising additional debt would only worsen these indicators of financial risk. The debt/equity ratio would rise to 225% on a book value basis and the interest coverage ratio would fall to 2.7 times, suggesting that Echo Co would experience difficulty in making interest payments.

The proposed use to which the newly-raised funds would be put merits further investigation. Additional finance should be raised when it is needed, rather than being held for speculative purposes. Until a suitable investment opportunity comes along, Echo Co will be paying an opportunity cost on the new finance equal to the difference between the interest rate on the new debt (10%) and the interest paid on short-term investments. This opportunity cost would decrease shareholder wealth. Even if an investment opportunity arises, it is very unlikely that the funds needed would be exactly equal to \$15m.

The interest charge in the income statement information is \$3m while the interest payable on the 8% loan notes is  $2\cdot4m$  (30 x 0.08). It is reasonable to assume that \$0.6m of interest is due to an overdraft. Assuming a short-term interest rate lower than the 8% loan note rate – say 6% – implies an overdraft of approximately \$10m (0.6/0.06), which is one-third of the amount of the long-term debt. The debt/equity ratio calculated did not include this significant amount of short-term debt and therefore underestimates the financial risk of Echo Co.

The bond issue would be repayable in eight years' time, which is five years after the redemption date of the current loan note issue. The need to redeem the current \$30m loan note issue cannot be ignored in the financial planning of the company. The proposal to raise £15m of long-term debt finance should arise from a considered strategic review of the long-term and short-term financing needs of Echo Co, which must also consider redemption or refinancing of the current loan note issue and, perhaps, reduction of the sizeable overdraft, which may be close to, or in excess of, its agreed limit.

In light of the concerns and considerations discussed, the proposal to raise additional debt finance cannot be recommended.

#### Analysis

Current gearing (debt/equity ratio using book values) = 30/20 = 150%Revised gearing (debt/equity ratio using book values) = (30 + 15)/20 = 225%

Current interest coverage ratio = 12/3 = 4 times Additional interest following debt issue =  $15m \times 0.1 = $1.5m$ Revised interest coverage ratio = 12/(3 + 1.5) = 2.7 times

### (c) Analysis

Rights issue price =  $2 \cdot 30 \times 0.8 = \$1 \cdot 84$ Theoretical ex rights price =  $(1 \cdot 84 + (2 \cdot 30 \times 4))/5 = \$2 \cdot 21$  per share Number of new shares issued =  $(5/0 \cdot 5)/4 = 2 \cdot 5$  million Cash raised =  $1 \cdot 84 \times 2 \cdot 5m = \$4 \cdot 6$  million Number of shares in issue after rights issue =  $10 + 2 \cdot 5 = 12 \cdot 5$  million

Current gearing (debt/equity ratio using book values) = 30/20 = 150%Revised gearing (debt/equity ratio using book values) =  $30/24 \cdot 6 = 122\%$ 

Current interest coverage ratio = 12/3 = 4 times Current return on equity (ROE) = 6/20 = 30%

In the absence of any indication as to the return expected on the new funds, we can assume the rate of return will be the same as on existing equity, an assumption consistent with the calculated theoretical ex rights price.

After-tax return on the new funds =  $4 \cdot 6m \times 0.3 = $1.38$  million Before-tax return on new funds =  $1.38m \times (9/6) = $2.07$  million Revised interest coverage ratio = (12 + 2.07)/3 = 4.7 times

The current debt/equity and interest coverage ratios suggest that there is a need to reduce the financial risk of Echo Co. A rights issue would reduce the debt/equity ratio of the company from 150% to 122% on a book value basis, which is 50% higher than the average debt/equity ratio of similar companies. After the rights issue, financial gearing is still therefore high enough to be a cause for concern.

The interest coverage ratio would increase from 4 times to 4.7 times, again assuming that the new funds will earn the same return as existing equity funds. This is still much lower than the average interest coverage ratio of similar companies, which is 8 times. While 4.7 times is a safer level of interest coverage, it is still somewhat on the low side.

No explanation has been offered for the amount to be raised by the rights issue. Why has the Finance Director proposed that \$4.6m be raised? If the proposal is to reduce financial risk, what level of financial gearing and interest coverage would be seen as safe by shareholders and other stakeholders? What use would be made of the funds raised? If they are used to redeem debt they will not have a great impact on the financial position of the company, in fact it appears likely that that the overdraft is twice as big as the amount proposed to be raised by the rights issue. The refinancing need therefore appears to be much greater than \$4.6m. If the funds are to be used for investment purposes, further details of the investment project, its expected return and its level of risk should be considered.

There seems to be no convincing rationale for the proposed rights issue and it cannot therefore be recommended, at least on financial grounds.

(d) Operating leasing is a popular source of finance for companies of all sizes and many reasons have been advanced to explain this popularity. For example, an operating lease is seen as protection against obsolescence, since it can be cancelled at short notice without financial penalty. The lessor will replace the leased asset with a more up-to-date model in exchange for continuing leasing business. This flexibility is seen as valuable in the current era of rapid technological change, and can also extend to contract terms and servicing cover. Operating leasing is often compared to borrowing as a source of finance and offers several attractive features in this area. There is no need to arrange a loan in order to acquire an asset and so the commitment to interest payments can be avoided, existing assets need not be tied up as security and negative effects on return on capital employed can be avoided. Since legal title does not pass from lessor to lessee, the leased asset can be recovered by the lessor in the event of default on lease rentals. Operating leasing can therefore be attractive to small companies or to companies who may find it difficult to raise debt.

Operating leasing can also be cheaper than borrowing to buy. There are several reasons why the lessor may be able to acquire the leased asset more cheaply than the lessee, for example by taking advantage of bulk buying, or by having access to lower cost finance by virtue of being a much larger company. The lessor may also be able use tax benefits more effectively than the lessee. A portion of these benefits can be made available to the lessee in the form of lower lease rentals, making operating leasing a more attractive proposition that borrowing.

Operating leases also have the attraction of being off-balance sheet financing, in that the finance used to acquire use of the leased asset does not appear in the balance sheet.

4 (a) The objectives of working capital management are profitability and liquidity. The objective of profitability supports the primary financial management objective, which is shareholder wealth maximisation. The objective of liquidity ensures that companies are able to meet their liabilities as they fall due, and thus remain in business.

However, funds held in the form of cash do not earn a return, while near-liquid assets such as short-term investments earn only a small return. Meeting the objective of liquidity will therefore conflict with the objective of profitability, which is met by investing over the longer term in order to achieve higher returns.

Good working capital management therefore needs to achieve a balance between the objectives of profitability and liquidity if shareholder wealth is to be maximised.

(b) Cost of current ordering policy of PKA Co Ordering cost = €250 x (625,000/100,000) = €1,563 per year Weekly demand = 625,000/50 = 12,500 units per week Consumption during 2 weeks lead time = 12,500 x 2 = 25,000 units Buffer stock = re-order level less usage during lead time = 35,000 - 25,000 = 10,000 units Average stock held during the year = 10,000 + (100,000/2) = 60,000 units Holding cost = 60,000 x €0.50 = €30,000 per year Total cost = ordering cost plus holding cost = €1,563 + €30,000 = €31,563 per year

Economic order quantity =  $((2 \times 250 \times 625,000)/(0.5)^{1/2} = 25,000 \text{ units}$ Number of orders per year = 625,000/25,000 = 25 per year Ordering cost =  $€250 \times 25 = €6,250$  per year Holding cost (ignoring buffer stock) =  $€0.50 \times (25,000/2) = €0.50 \times 12,500 = €6,250$  per year Holding cost (including buffer stock) =  $€0.50 \times (10,000 + 12,500) = €11,250$  per year Total cost of EOQ-based ordering policy = €6,250 + €11,250 = €17,500 per year

Saving for PKA Co by using EOQ-based ordering policy = €31,563 - €17,500 = €14,063 per year

(c) The information gathered by the Financial Manager of PKA Co indicates that two areas of concern in the management of domestic accounts receivable are the increasing level of bad debts as a percentage of credit sales and the excessive credit period being taken by credit customers.

## Reducing bad debts

The incidence of bad debts, which has increased from 5% to 8% of credit sales in the last year, can be reduced by assessing the creditworthiness of new customers before offering them credit and PKA Co needs to introduce a policy detailing how this should be done, or review its existing policy, if it has one, since it is clearly not working very well. In order to do this, information about the solvency, character and credit history of new clients is needed. This information can come from a variety of sources, such as bank references, trade references and credit reports from credit reference agencies. Whether credit is offered to the new customer and the terms of the credit offered can then be based on an explicit and informed assessment of default risk.

## Reduction of average accounts receivable period

Customers have taken an average of 75 days credit over the last year rather than the 30 days offered by PKA Co, i.e. more than twice the agreed credit period. As a result, PKA Co will be incurring a substantial opportunity cost, either from the additional interest cost on the short-term financing of accounts receivable or from the incremental profit lost by not investing the additional finance tied up by the longer average accounts receivable period. PKA Co needs to find ways to encourage accounts receivable to be settled closer to the agreed date.

Assuming that the credit period offered by PKA Co is in line with that of its competitors, the company should determine whether they too are suffering from similar difficulties with late payers. If they are not, PKA Co should determine in what way its own terms differ from those of its competitors and consider whether offering the same trade terms would have an impact on its accounts receivable. For example, its competitors may offer a discount for early settlement while PKA Co does not and introducing a discount may achieve the desired reduction in the average accounts receivable period. If its competitors are experiencing a similar accounts receivable problem, PKA Co could take the initiative by introducing more favourable early settlement terms and perhaps generate increased business as well as reducing the average accounts receivable period.

PKA Co should also investigate the efficiency with which accounts receivable are managed. Are statements sent regularly to customers? Is an aged accounts receivable analysis produced at the end of each month? Are outstanding accounts receivable contacted regularly to encourage payment? Is credit denied to any overdue accounts seeking further business? Is interest charged on overdue accounts? These are all matters that could be included by PKA Co in a revised policy on accounts receivable management.

### (d) Money market hedge

PKA Co should place sufficient dollars on deposit now so that, with accumulated interest, the six-month liability of \$250,000 can be met. Since the company has no surplus cash at the present time, the cost of these dollars must be met by a short-term euro loan.

Six-month dollar deposit rate = 3.5/2 = 1.75%Current spot selling rate = 1.998 - 0.002 = \$1.996 per euro Six-month euro borrowing rate = 6.1/2 = 3.05%

Dollars deposited now =  $250,000/1\cdot0175 = $245,700$ Cost of these dollars at spot =  $245,700/1\cdot996 = 123,096$  euros Euro value of loan in six months' time =  $123,096 \times 1\cdot0305 = 126,850$  euros

#### Forward market hedge

Six months forward selling rate = 1.979 - 0.004 = \$1.975 per euro Euro cost using forward market hedge = 250,000/1.975 = 126,582 euros

#### Lead payment

Since the dollar is appreciating against the euro, a lead payment may be worthwhile. Euro cost now = 250,000/1.996 = 125,251 euros This cost must be met by a short-term loan at a six-month interest rate of 3.05%Euro value of loan in six months' time =  $125,251 \times 1.0305 = 129,071$  euros

#### Evaluation of hedges

The relative costs of the three hedges can be compared since they have been referenced to the same point in time, i.e. six months in the future. The most expensive hedge is the lead payment, while the cheapest is the forward market hedge. Using the forward market to hedge the account payable currency risk can therefore be recommended.

## Fundamentals Level – Skills Module, Paper F9 Financial Management

## December 2007 Marking Scheme

1	(a)	Price/earnings ratio value of company Proposed dividend per share Average dividend growth rate Cost of equity using CAPM Dividend growth model value of company Discussion	Marks 2 1 1 2 4	Marks 11
	(b)	Conversion value Market value Floor value Conversion premium	1 2 2 1	6
	(c)	Weak form efficiency Semi-strong form efficiency Strong form efficiency Significance of semi-strong form efficiency	1-2 1-2 1-2 2-3 Maximum	<u>8</u> 25
2	(a)	After-tax weighted average cost of capital Annual contribution Fixed costs Taxation Capital allowance tax benefits Scrap value Discount factors Net present value Comment	2 2 1 1 3 1 1 1 1 1 2 2 2 1 1 1 1 1 2 2 1 1 3 1 1 1 3 1 1 1 3 1 1 1 3 1 1 1 3 1 1 1 3 1 1 1 3 1 1 1 1 3 1	13
	(b)	Net present value calculation Internal rate of return calculation Comment	1 2 1-2 Maximum	4
	(c)	Risk and uncertainty Discussion of sensitivity analysis Discussion of probability analysis	2–3 2–3 2–3 Maximum	<u>     8</u> 25

3	(a)	Discussion of proposal to increase dividend	Marks	Marks 5
3	(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
4	(2)	Profitability and liquidity	1	
7	(a)	Discussion of conflict between objectives	2	
				3
	(b)	Cost of current ordering policy Cost of EOQ-based ordering policy	3	
		Saving by using EOQ model	1	
				7
				/
	(c)	Reduction of bad debts	3–4	
		Reduction of average accounts receivable period Discussion of other improvements	3–4 1–2	
			Maximum	7
			Waximum	/
	(d)		3	
		Forward market hedge	2	
		Lead payment Evaluation	2	
				8
				25
				20