Answers

1 (a) After-tax cost of borrowing = 8·6 x (1 – 0·3) = 6% per year

Evaluation of leasing

Year	Cash flow	Amount ($)	6% Discount factors	Present value ($)
0–3	Lease rentals	(380,000)	1·000 + 2·673 = 3·673	(1,395,740)
2–5	Tax savings	114,000	4·212 – 0·943 = 3·269	372,666
				(1,023,074)

Present value of cost of leasing = $1,023,074

Evaluation of borrowing to buy

Year	Capital	Licence fee	Tax benefits	Net cash flow	6% discount factors	Present value
	$	$	$	$		$
0	(1,000,000)			(1,000,000)	1·000	(1,000,000)
1		(104,000)		(104,000)	0·943	(98,072)
2		(108,160)	106,200	(1,960)	0·890	(1,744)
3		(112,486)	88,698	(23,788)	0·840	(19,982)
4	100,000	(116,986)	75,934	58,948	0·792	46,687
5			131,659	131,659	0·747	98,349
						(974,762)

Present value of cost of borrowing to buy = $974,762

Workings

Year	Capital allowance	Tax benefits	Licence fee tax benefits	Total
	$	$	$	$
2	1,000,000 x 0·25 = 250,000	75,000	31,200	106,200
3	750,000 x 0·25 = 187,500	56,250	32,448	88,698
4	562,500 x 0·25 =140,625	42,188	33,746	75,934
5	421,875 – 100,000 = 321,875	96,563	35,096	131,659

ASOP Co should buy the new technology, since the present cost of borrowing to buy is lower than the present cost of leasing.

(b) Nominal terms net present value analysis

Year	1	2	3	4	5
	$	$	$	$	$
Cost savings	365,400	479,250	637,450	564,000	
Tax liabilities		(109,620)	(143,775)	(191,235)	(169,200)
Net cash flow	365,400	369,630	493,675	372,765	(169,200)
Discount at 11%	0·901	0·812	0·731	0·659	0·593
Present values	329,225	300,140	360,876	245,652	(100,336)

Present value of benefits	1,135,557
Present cost of financing	(974,762)
Net present value	160,795

The investment in new technology is acceptable on financial grounds, as it has a positive net present value of $160,795.

Workings

Year	1	2	3	4
Operating cost saving ($/unit)	6·09	6·39	6·71	7·05
Production (units/year)	60,000	75,000	95,000	80,000
Operating cost savings ($/year)	365,400	479,250	637,450	564,000
Tax liabilities at 30% ($/year)	109,620	143,775	191,235	169,200

(Examiner's note: Including the financing cash flows in the NPV evaluation and discounting them by the WACC of 11% is also acceptable)

(c) The equivalent annual cost or benefit method can be used to calculate the equal annual amount of cost or benefit which, when discounted at the appropriate cost of capital, produces the same present value of cost or net present value as a set of varying annual costs or benefits.

For example, the net present value (NPV) of investing in the new technology of $160,795 in part (b) was calculated using a weighted average cost of capital (WACC) of 11% over an expected life of four years. The annuity factor for 11% and four years is 3·102. The equivalent annual benefit (EAB) is therefore 160,795/3·102 = $51,835·9 per year. This can be checked by multiplying the EAB by the annuity factor, i.e. 51,835·9 x 3·102 = $160,795.

If an alternative investment in similar technology over five years had a lower EAB, the four-year investment would be preferred as it has the higher EAB.

(d) When capital is rationed, the optimal investment schedule is the one that maximises the return per dollar invested. The capital rationing problem is therefore concerned with limiting factor analysis, but the approach adopted is slightly different depending on whether the investment projects being evaluated are divisible or indivisible.

With divisible projects, the assumption is made that a proportion rather than the whole investment can be undertaken, with the net present value (NPV) being proportional to the amount of capital invested. If 70% of a project is undertaken, for example, the resulting NPV is assumed to be 70% of the NPV of investing in the whole project.

For each divisible project, a profitability index can be calculated, defined either as the net present value of the project divided by its initial investment, or as the present value of the future cash flows of the project divided by its initial investment. The profitability index represents the return per dollar invested and can be used to rank the investment projects. The limited investment funds can then be invested in the projects in the order of their profitability indexes, with the final investment selection being a proportionate one if there is insufficient finance for the whole project. This represents the optimum investment schedule when capital is rationed and projects are divisible.

With indivisible projects, ranking by profitability index will not necessarily indicate the optimum investment schedule, since it will not be possible to invest in part of a project. In this situation, the NPV of possible combinations of projects must be calculated. The most likely combinations are often indicated by the profitability index ranking. The combination of projects with the highest aggregate NPV will then be the optimum investment schedule.

2 (a) The cost of debt of Bond A can be found by linear interpolation.

Using 11%, the difference between the present value of future cash flows and the ex interest market value = (9 x 5·889) + (100 x 0·352) – 95·08 = 53·00 + 35·20 – 95·08 = ($6·88)
As the net present value is negative, 11% is higher than the cost of debt.

Using 9%, the difference between the present value of future cash flows and the ex interest market value = (9 x 6·418) + (100 x 0·422) – 95·08 = 57·76 + 42·20 – 95·08 = $4·88
As the net present value is positive, 9% is lower than the cost of debt.

Cost of debt = 9 + ((11 – 9) x 4·88)/(4·88 + 6·88) = 9 + 0·83 = 9·83%

Using estimates other than 11% and 9% will give slightly different values of the cost of debt.

(b) A key factor here could be the duration of the bond issues, linked to the term structure of interest rates. Normally, the longer the time to maturity of a debt, the higher will be the interest rate and the cost of debt. Bond A has the greater time to maturity and therefore would be expected to have a higher interest rate and a higher cost of debt than Bond B, which is the case here.

Liquidity preference theory suggests that investors require compensation for deferring consumption, i.e. for not having access to their cash in the current period, and so providers of debt finance require higher compensation for lending for longer periods. The premium for lending for longer periods also reflects the way that default risk increases with time.

Expectations theory suggests that the shape of the yield curve depends on expectations as to future interest rates. If the expectation is that future interest rates will be higher than current interest rates, the yield curve will slope upwards. If the expectation is that future interest rates will be lower than at present, the yield curve will slope downwards.

Market segmentation theory suggests that future interest rates depend on conditions in different debt markets, e.g. the short-term market, the medium-term market and the long-term market. The shape of the yield curve therefore depends on the supply of, and demand for, funds in the market segments.

Since the two bonds were issued at the same time by the same company, the business risk of DD Co can be discounted as a reason for the difference between the two costs of debt. If the two bonds had been issued by different companies, a different business risk might have been a reason for the difference in the costs of debt.

The size of the debt could be a contributory factor, since the Bond A issue is twice the size of the Bond B issue. The greater size of the Bond A issue could be one of the reasons it has the higher cost of debt.

(c) **(i)** Cost of equity = 4 + (1·2 x (11 – 4)) = 4 + 8·4 = 12·4%

(ii) Dividend growth rate = 100 x ((52/50) – 1) = 100 x (1·04 – 1) = 4% per year
Share price using DGM = (50 x 1·04)/(0·124 – 0·04) = 52/0·84 = 619c or $6·19

(iii) Number of ordinary shares = 25 million
Market value of equity = 25m x 6·19 = $154·75 million
Market value of Bond A issue = 20m x 95·08/100 = $19·016m
Market value of Bond B issue = 10m x 102·01/100 = $10·201m
Market value of debt = $29·217m
Market value of capital employed = 154·75m + 29·217m = $183·967m

Capital gearing = 100 x 29·217/183·967 = 15·9%

(iv) WACC = ((12·4 x 154·75) + (9·83 x 19·016) + (7·82 x 10·201))/183·967 = 11·9%

(d) Miller and Modigliani showed that, in a perfect capital market, the value of a company depended on its investment decision alone, and not on its dividend or financing decisions. In such a market, a change in dividend policy by DD Co would not affect its share price or its market capitalisation. They showed that the value of a company was maximised if it invested in all projects with a positive net present value (its optimal investment schedule). The company could pay any level of dividend and if it had insufficient finance, make up the shortfall by issuing new equity. Since investors had perfect information, they were indifferent between dividends and capital gains. Shareholders who were unhappy with the level of dividend declared by a company could gain a 'home-made dividend' by selling some of their shares. This was possible since there are no transaction costs in a perfect capital market.

Against this view are several arguments for a link between dividend policy and share prices. For example, it has been argued that investors prefer certain dividends now rather than uncertain capital gains in the future (the 'bird-in-the-hand' argument). It has also been argued that real-world capital markets are not perfect, but semi-strong form efficient. Since perfect information is therefore not available, it is possible for information asymmetry to exist between shareholders and the managers of a company. Dividend announcements may give new information to shareholders and as a result, in a semi-strong form efficient market, share prices may change. The size and direction of the share price change will depend on the difference between the dividend announcement and the expectations of shareholders. This is referred to as the 'signalling properties of dividends'.

It has been found that shareholders are attracted to particular companies as a result of being satisfied by their dividend policies. This is referred to as the 'clientele effect'. A company with an established dividend policy is therefore likely to have an established dividend clientele. The existence of this dividend clientele implies that the share price may change if there is a change in the dividend policy of the company, as shareholders sell their shares in order to reinvest in another company with a more satisfactory dividend policy. In a perfect capital market, the existence of dividend clienteles is irrelevant, since substituting one company for another will not incur any transaction costs. Since real-world capital markets are not perfect, however, the existence of dividend clienteles suggests that if DD Co changes its dividend policy, its share price could be affected.

3 (a) Amount of equity finance to be invested in euros = 13m/2 = €6·5 million
Amount of equity to be invested in dollars = 6·5m/1·3000 = $5 million
The amount of equity finance to be raised in dollars = 5m + 0·312m = $5·312m

Rights issue price = 4·00 x 0·83 = $3·32 per share

Number of new shares issued = 5·312m/3·32 = 1·6 million shares
Current number of ordinary shares in issue = $100m/4·00 = 25 million shares
Total number of shares after the rights issue = 25m + 1·6m = 26·6 million shares
Theoretical ex rights price = ((25m x 4) + (1·6m x 3·32))/26·6 = 105·312/26·6 = $3·96 per share

(b) (i) *Effect on earnings per share*
Current EPS = 100 x 4·00/10 = 40 cents per share

(Alternatively, current profit after tax = 100m/10 = $10 million
Current EPS = 100 x 10m/25m = 40 cents per share)

Increase in profit before interest and tax = 13m x 0·2 = €2,600,000
Dollar increase in profit before interest and tax = 2,600,000/1·3000 = $2 million

	$000
Increase in profit before interest and tax	2,000
Increase in interest = 6·5m x 0·08 = 0·52m/1·3000 =	400
Increase in profit before tax	1,600
Taxation = 1·6m x 0·3 =	480
Increase in profit after tax	1,120
Current profit after tax = 100m/10 =	10,000
Revised profit after tax	11,120

Alternatively, using euros:

	€000
Increase in profit before interest and tax = 13m x 0·2 =	2,600
Increase in interest = 6·5m x 0·08 =	520
Increase in profit before tax	2,080
Taxation = 2·08m x 0·3 =	624
Increase in profit after tax	1,456
	$000
Increase in dollar profit after tax = 1·456m/1·300 =	1,120
Current profit after tax = 100m/10 =	10,000
Revised profit after tax	11,120

Revised EPS = 100 x 11·12m/26·6m = 41·8 cents/share

(ii) *Effect on shareholder wealth*
Expected share price using PER method = (41·8 x 10)/100 = $4·18 per share
This should be compared to the theoretical ex rights price per share in order to evaluate any change in shareholder wealth.
The investment produces a capital gain of 22 cents per share ($4·18 – $3·96)
In the absence of any information about dividend payments, it appears that the investment will increase the wealth of shareholders.

(c) Transaction risk is exchange rate risk that arises as a result of short-term transactions. Because it is short term in nature, it has a direct effect on cash flows, which can either increase or decrease, depending on the movement in exchange rates before the settlement dates of individual short-term transactions.

NG Co is exposed to transaction risk on its euro-denominated European sales and interest payments. The dollar value of its euro-denominated sales, for example, would decrease if the dollar appreciated against the euro.

Translation risk is exchange rate risk that arises from the need to consolidate financial performance and financial position when preparing consolidated financial statements. For this reason, it is also referred to as accounting exposure.

NG Co is exposed to translation risk on its euro-denominated non-current assets. The dollar value of the non-current assets acquired by investing in the storage, packing and distribution network, for example, will change as the euro/dollar exchange rate changes.

(d) NG Co will receive euro-denominated income and will incur euro-denominated expenses as a result of its European operations. One hedging method is to maintain a euro-denominated bank account for all euro-denominated transactions. This natural hedge will minimise the need for cash to be exchanged from one currency to another.

Transactions that are deemed to have significant exchange-rate risk could be hedged using the forward market, i.e. using a forward exchange contract or FEC. This is a binding contract between a company and a bank for delivery or receipt of an agreed amount of foreign currency at an agreed exchange rate on an agreed future date.

The six-monthly interest payment of €260,000 can be used to illustrate an FEC. The current cost of the interest payment is $200,000. In six months and twelve months, as the euro is expected to strengthen against the dollar, the dollar cost of the interest payment is expected to rise. In order to protect against unexpected adverse exchange rate movements, NG Co can lock into the six-month and twelve-month forward rates of 1·2876 €/$ and 1·2752 €/$ using forward exchange contracts, thereby guaranteeing the dollar cost of its euro-denominated interest payments. The dollar cost of the six-month interest payment would be $201,926 (€260,000/1·2876) and the dollar cost of the twelve-month interest payment would be $203,890 (€260,000/1·2752).

An alternative to an FEC is a money market hedge. NG Co could borrow now in dollars in order to make a euro deposit which, with accrued interest, will be sufficient to pay the euro-denominated interest in six months' time.

The six-month euro deposit rate available to NG Co is 1·39% (100 x ($1·028^{0.5}$ – 1)) and the six-month dollar borrowing rate available to NG Co is 2·62% (100 x ($1·053^{0.5}$ – 1)). The amount of dollars to deposit now would be €256,436 (260,000/1·0139) and to make this payment NG Co would need to borrow $197,259 (256,436/1·3000). The six-month dollar cost of this debt would be $202,427 (197,259 x 1·0262). This is more expensive than using the six-month forward exchange contract.

(Examiner's note: an illustration using the interest payment due in twelve months would also be acceptable. It would also be acceptable to use six-monthly interest rates that are one half of the annual interest rates.)

Other hedging methods that could be identified and briefly discussed are currency futures, currency options and currency swaps.

4 (a) The role of financial intermediaries in providing short-term finance for use by business organisations is to provide a link between investors who have surplus cash and borrowers who have financing needs. The amounts of cash provided by individual investors may be small, whereas borrowers need large amounts of cash: one of the functions of financial intermediaries is therefore to aggregate invested funds in order to meet the needs of borrowers. In so doing, they provide a convenient and readily accessible route for business organisations to obtain necessary funds.

Small investors are likely to be averse to losing any capital value, so financial intermediaries will assume the risk of loss on short-term funds borrowed by business organisations, either individually or by pooling risks between financial intermediaries. This aspect of the role of financial intermediaries is referred to as risk transformation. Financial intermediaries also offer maturity transformation, in that investors can deposit funds for a long period of time while borrowers may require funds on a short-term basis only, and vice versa. In this way the needs of both borrowers and lenders can be satisfied.

(b) Forecast income statement

	$m
Turnover = 16·00m x 1·084 =	17·344
Cost of sales = 17·344m – 5·203m =	12·141
Gross profit = 17·344m x 30% =	5·203
Other expenses = 5·203m – 3·469m =	1·734
Net profit = 17·344m x 20% =	3·469
Interest = (10m x 0·08) + 0·140m =	0·940
Profit before tax	2·529
Tax = 2·529m x 0·3 =	0·759
Profit after tax	1·770
Dividends = 1·770m x 50% =	0·885
Retained profit	0·885

Forecast statement of financial position

	$m	$m
Non-current assets		22·00
Current assets		
Inventory	3·66	
Trade receivables	3·09	
		6·75
Total assets		28·75

Equity finance:	$m	$m
Ordinary shares	5·00	
Reserves	8·39	
		13·39
Bank loan		10·00
		23·39
Current liabilities		
Trade payables	2·49	
Overdraft	2·87	
		5·36
Total liabilities		28·75

Workings
Inventory = 12·141m x (110/365) = $3·66m
Trade receivables = 17·344m x (65/365) = $3·09m
Trade payables = 12·141m x (75/365) = $2·49m
Reserves = 7·5m + 0·885m = $8·39m
Overdraft = 28·75m – 23·39m – 2·49 = $2·87m (balancing figure)

(c) Working capital financing policies can be classified into conservative, moderate (or matching) and aggressive, depending on the extent to which fluctuating current assets and permanent current assets are financed by short-term sources of finance. Permanent current assets are the core level of investment in current assets needed to support a given level of business activity or turnover, while fluctuating current assets are the changes in the levels of current assets arising from the unpredictable nature of some aspects of business activity.

A conservative working capital financing policy uses long-term funds to finance non-current assets and permanent current assets, as well as a proportion of fluctuating current assets. This policy is less risky and less profitable than an aggressive

working capital financing policy, which uses short-term funds to finance fluctuating current assets and a proportion of permanent current assets as well. Between these two extremes lies the moderate (or matching) policy, which uses long-term funds to finance long-term assets (non-current assets and permanent current assets) and short-term funds to finance short-term assets (fluctuating current assets).

The current statement of financial position shows that APX Co uses trade payables and an overdraft as sources of short-term finance. In terms of the balance between short- and long-term finance, 89% of current assets (100 x 4·1/4·6) are financed from short-term sources and only 11% are financed from long-term sources. Since a high proportion of current assets are permanent in nature, this appears to be a very aggressive working capital financing policy which carries significant risk. If the overdraft were called in, for example, APX Co might have to turn to more expensive short-term financing.

The forecast statement of financial position shows a lower reliance on short-term finance, since 79% of current assets (100 x 5·36/6·75) are financed from short-term sources and 21% are financed from long-term sources. This decreased reliance on an aggressive financing policy is sensible, although with a forecast interest coverage ratio of only 3·7 times (3·469/0·94), APX Co has little scope for taking on more long-term debt. An increase in equity funding to decrease reliance on short-term finance could be considered.

(d) *Working capital management*

Financial analysis shows deterioration in key working capital ratios. The inventory turnover period is expected to increase from 81 days to 110 days, the trade receivables period is expected to increase from 50 days to 65 days and the trade payables period is expected to increase from 64 days to 75 days. It is also a cause for concern here that the values of these working capital ratios for the next year are forecast, i.e. APX Co appears to be anticipating a worsening in its working capital position. The current and forecast values could be compared to average or sector values in order to confirm whether this is in fact the case.

Because current assets are expected to increase by more than current liabilities, the current ratio and the quick ratio are both expected to increase in the next year, the current ratio from 1·12 times to 1·26 times and the quick ratio from 0·54 times to 0·58 times. Again, comparison with sector average values for these ratios would be useful in making an assessment of the working capital management of APX Co. The balance between trade payables and overdraft finance is approximately the same in both years (trade payables are 46% of current liabilities in the current statement of financial position and 47% of current liabilities in the forecast statement of financial position), although reliance on short-term finance is expected to fall slightly in the next year.

The deteriorating working capital position may be linked to an expected deterioration in the overall financial performance of APX Co. For example, the forecast gross profit margin (30%) and net profit margin (20%) are both less than the current values of these ratios (32% and 23% respectively), and despite the increase in turnover, return on capital employed (ROCE) is expected to fall from 16·35% to 14·83%.

Analysis

Extracts from current income statement:

	$m
Turnover	16·00
Cost of sales	10·88
Gross profit	5·12
Other expenses	1·44
Net profit	3·68

	Current	Forecast
Gross profit margin (100 x 5·12/16·00)	32%	
		30%
Net profit margin (100 x 3·68/16·00)	23%	
		20%
ROCE (100 x 3·68/22·5)	16·35%	
(100 x 3·469/23·39)		14·83%
Inventory period (365 x 2·4/10·88)	81 days	
		110 days
Receivables period (365 x 2·2/16·00)	50 days	
		65 days
Payables period (365 x 1·9/10·88)	64 days	
		75 days
Current ratio (4·6/4·1)	1·12 times	
(6·75/5·36)		1·26 times
Quick ratio (2·2/4·1)	0·54 times	
(3·09/5·36)		0·58 times

Fundamentals Level – Skills Module, Paper F9
Financial Management **December 2009 Marking Scheme**

			Marks	*Marks*
1	**(a)**	Present value of lease rentals	2	
		Present value of lease rental tax benefits	1	
		Present value of cost of leasing	1	
		Investment and scrap values	1	
		Licence fee	1	
		Capital allowance tax benefits	2	
		Licence fee tax benefits	1	
		Present value of cost of borrowing to buy	1	
		Appropriate decision on leasing versus buying	1	
				11
	(b)	Inflated cost savings	2	
		Tax liabilities	1	
		Present values of net cash flows	1	
		Net present value	1	
		Advice on acceptability of investment	1	
				6
	(c)	Definition of equivalent cost or benefit	1	
		Relevant discussion	1	
		Appropriate illustration	1	
				3
	(d)	Capital rationing	1–2	
		Divisible projects and profitability index	2–3	
		Indivisible projects and combinations	1–2	
			Maximum	5
				25
2	**(a)**	Calculation of cost of debt of Bond A		3
	(b)	Term structure of interest rates	1–2	
		Liquidity preference theory	1–2	
		Expectations theory	1–2	
		Market segmentation theory	1–2	
		Other relevant discussion	1–2	
			Maximum	6
	(c)	Cost of equity	2	
		Dividend growth rate	1	
		Share price using dividend growth model	2	
		Capital gearing	2	
		Weighted average cost of capital	2	
				9
	(d)	Dividend irrelevance	3–4	
		Dividend relevance	3–4	
			Maximum	7
				25

			Marks	*Marks*
3	**(a)**	Amount of equity finance to be raised in dollars	1	
		Rights issue price	1	
		Theoretical ex rights price	2	
				4
	(b)	Current EPS	1	
		Increase in PBIT from investment	1	
		Interest on bond issue	1	
		Revised dollar profit after tax	2	
		Revised EPS	1	
		Revised share price using PER method	1	
		Comment on effect on shareholder wealth	1–3	
			Maximum	9
	(c)	Transaction risk	1–2	
		Translation risk	1–2	
		Link to question	1–2	
			Maximum	4
	(d)	Euro account	1	
		Forward market hedge	1	
		Illustration of forward market hedge	1–2	
		Money-market hedge	1	
		Illustration of money-market hedge	1–2	
		Other hedging strategies, including derivatives	1–2	
			Maximum	8
				25
4	**(a)**	Relevant discussion on financial intermediaries		4
	(b)	Gross profit	1	
		Net profit	1	
		Profit before tax	1	
		Retained profit	1	
		Inventory	1	
		Trade receivables	1	
		Trade payables	1	
		Reserves	1	
		Overdraft	1	
		Layout and format	1	
			Maximum	9
	(c)	Working capital financing policies	2–3	
		Financial analysis	1–2	
		Working capital financing policy of company	2–3	
			Maximum	6
	(d)	Discussion of working capital management	3–4	
		Financial analysis	2–4	
			Maximum	6
				25