Answers

1 (a) Net present value of investment in new machinery

Year	1	2	3	4	5
	$000	$000	$000	$000	$000
Sales income	6,084	6,327	6,580	6,844	
Variable cost	(2,374)	(2,504)	(2,642)	(2,787)	
Contribution	3,710	3,823	3,938	4,057	
Fixed costs	(263)	(276)	(289)	(304)	
Cash flow	3,447	3,547	3,649	3,753	
Taxation		(689)	(709)	(730)	(751)
CA tax benefits		250	188	141	372
After-tax cash flow	3,447	3,108	3,128	3,164	(379)
Working capital	(24)	(25)	(26)	(27)	
Scrap value				250	
Net cash flow	3,423	3,083	3,102	3,387	(379)
Discount at 12%	0·893	0·797	0·712	0·636	0·567
Present values	3,057	2,457	2,209	2,154	(215)

	$000
PV of future cash flows	9,662
Initial investment	(5,000)
Working capital	(500)
NPV	4,162

As the net present value of $4·161 million is positive, the expansion can be recommended as financially acceptable.

Workings

Year	1	2	3	4
Selling price ($/unit)	676·00	703·04	731·16	760·41
Sales (units/year)	9,000	9,000	9,000	9,000
Sales income ($000)	6,084	6,327	6,580	6,844

Year	1	2	3	4
Variable cost ($/unit)	263·75	278·26	293·56	309·71
Sales (units/year)	9,000	9,000	9,000	9,000
Variable cost ($000)	2,374	2,504	2,642	2,787

Year	1	2	3	4
	$000	$000	$000	$000
Capital allowance	1,250·0	937·5	703·1	1,859·4
Tax benefit	250	188	141	372

Year	1	2	3	4
	$000	$000	$000	$000
Working capital	523·50	548·11	573·87	600·84
Incremental	24	25	26	27

Alternative NPV calculation where capital allowances are subtracted and added back

Year	1	2	3	4	5
	$000	$000	$000	$000	$000
Cash flow	3,447	3,547	3,649	3,753	
Capital allowances	(1,250)	(938)	(703)	(1,859)	
Taxable profit	2,197	2,609	2,946	1,894	
Taxation		(439)	(522)	(589)	(379)
After-tax profit	2,197	2,170	2,424	1,305	(379)
Capital allowances	1,250	938	703	1,859	
After-tax cash flow	3,447	3,108	3,127	3,164	(379)
Working capital	(24)	(25)	(26)	(27)	
Scrap value				250	
Net cash flow	3,423	3,083	3,101	3,387	(379)
Discount at 12%	0·893	0·797	0·712	0·636	0·567
Present values	3,057	2,457	2,208	2,154	(215)

NPV = 9,661 – 5,000 – 500 = $4·161 million

(b) A nominal (money terms) approach to investment appraisal discounts nominal cash flows with a nominal cost of capital. Nominal cash flows are found by inflating forecast values from current price estimates, for example, using specific inflation. Applying specific inflation means that different project cash flows are inflated by different inflation rates in order to generate nominal project cash flows.

A real terms approach to investment appraisal discounts real cash flows with a real cost of capital. Real cash flows are found by deflating nominal cash flows by the general rate of inflation. The real cost of capital is found by deflating the nominal cost of capital by the general rate of inflation, using the Fisher equation:

(1 + real discount rate) x (1 + inflation rate) = (1 + nominal discount rate)

The net present value for an investment project does not depend on whether a nominal terms approach or a real terms approach is adopted, since nominal cash flows and the nominal discount rate are both discounted by the general rate of inflation to give real cash flows and the real discount rate, respectively. Both approaches give the same net present value.

Tutorial note for illustrative purposes:
The real after-tax cost of capital of HDW Co can be found as follows:

1·12/1·047 = 1·07, i.e. the real after-tax cost of capital is 7%.

The following illustration deflates nominal net cash flows (NCF) by the general rate of inflation (4·7%) to give real NCF, which are then discounted by the real cost of capital (7%).

Year	1	2	3	4	5
	$000	*$000*	*$000*	*$000*	*$000*
Nominal NCF	*3,423*	*3,083*	*3,102*	*3,387*	*(379)*
Real NCF	*3,269*	*2,812*	*2,703*	*2,819*	*(301)*
Discount at 7%	*0·935*	*0·873*	*0·816*	*0·763*	*0·713*
Present values	*3,057*	*2,455*	*2,206*	*2,151*	*(215)*

Allowing for rounding, the illustration shows that the present values of the real cash flows are the same as the present values of the nominal cash flows, and that the real terms approach NPV of $4·154 million is the same as the nominal terms approach NPV of $4·161 million. The two approaches produce identical NPVs and offer the same investment advice.

(c) A listed company such as HDW Co is likely to have a range of financial objectives. Maximisation of shareholder wealth is often suggested to be the primary financial objective, and this can be substituted by the objective of maximising the company's share price. Other financial objectives that might be used by HDW Co could relate to earnings per share (for example, a target EPS value for a given period), operating profit (for example, a target level of profit before tax or PBIT), revenue (for example, a desired increase in revenue or sales) and so on. These examples of financial objectives can all be quantified, so that progress towards meeting them can be measured over time.

The investment in the new machine will enable HDW Co to meet increased demand for its products and the company expects to be able to sell all of the increased production at a profit. This will lead to increased revenue and operating profit (profit before interest and tax), so financial objectives relating to these accounting figures will be supported.

Whether a financial objective relating to increasing earnings per share (EPS) will be supported will depend on how the investment is financed. For example, raising equity finance by issuing new shares will dilute (decrease) EPS, while raising debt finance will increase interest payments, which will also dilute EPS.

The investment in the new machine has a positive net present value (NPV), so the market value of the company is expected to increase by the amount of the NPV. This increases the wealth of shareholders irrespective of how the investment is financed, since financing costs were accounted for by the discount rate (whether nominal or real). The investment in the new machine will therefore support the objective of shareholder wealth maximisation.

2 (a) Cost of equity

The geometric average dividend growth rate in recent years:
$(36\cdot3/30\cdot9)^{0\cdot25} - 1 = 1\cdot041 - 1 = 0\cdot041$ or 4·1% per year

Using the dividend growth model:
$K_e = 0\cdot041 + [(36\cdot3 \times 1\cdot041)/470] = 0\cdot041 + 0\cdot080 = 0\cdot121$ or 12·1%

Cost of preference shares

As the preference shares are not redeemable:
$K_p = 100 \times [(0\cdot04 \times 100)/40] = 10\%$

Cost of debt of bonds

The annual after-tax interest payment is $7 \times 0\cdot7 = \$4\cdot9$ per bond.

Using linear interpolation:

Year	Cash flow	$	5% DF	PV ($)	4% DF	PV ($)
0	Market price	(104·50)	1·000	(104·50)	1·000	(104·5)
1–6	Interest	4·9	5·076	24·87	5·242	25·69
6	Redemption	105	0·746	78·33	0·790	82·95
				(1·30)		4·14

After-tax cost of debt = $4 + [((5 - 4) \times 4\cdot14)/(4\cdot14 + 1\cdot30)] = 4 + 0\cdot76 = 4\cdot8\%$

Cost of debt of bank loan

If the bank loan is assumed to be perpetual (irredeemable), the after-tax cost of debt of the bank loan will be its after-tax interest rate, i.e. $4\% \times 0\cdot7 = 2\cdot8\%$ per year.

Market values

Number of ordinary shares = 4,000,000/0·5 = 8 million shares

	$000
Equity: 8m x 4·70 =	37,600
Preference shares: 3m x 0·4 =	1,200
Redeemable bonds: 3m x 104·5/100 =	3,135
Bank loan (book value used)	1,000
Total value of AMH Co	42,935

WACC calculation

$[(12\cdot1 \times 37,600) + (10 \times 1,200) + (4\cdot8 \times 3,135) + (2\cdot8 \times 1,000)]/42,935 = 11\cdot3\%$

(b) The capital asset pricing model (CAPM) assumes that investors hold diversified portfolios, so that unsystematic risk has been diversified away. Companies using the CAPM to calculate a project-specific discount rate are therefore concerned only with determining the minimum return that must be generated by an investment project as compensation for its systematic risk.

The CAPM is useful where the business risk of an investment project is different from the business risk of the investing company's existing business operations. In such a situation, one or more proxy companies are identified that have similar business risk to the investment project. The equity beta of the proxy company represents the systematic risk of the proxy company, and reflects both the business risk of the proxy company's business operations and the financial risk arising from the proxy company's capital structure.

Since the investing company is only interested in the business risk of the proxy company, the proxy company's equity beta is 'ungeared' to remove the effect of its capital structure. 'Ungearing' converts the proxy company's equity beta into an asset beta, which represents business risk alone. The asset betas of several proxy companies can be averaged in order to remove any small differences in business operations.

The asset beta can then be 'regeared', giving an equity beta whose systematic risk takes account of the financial risk of the investing company as well as the business risk of an investment project. Both ungearing and regearing use the weighted average beta formula, which equates the asset beta with the weighted average of the equity beta and the debt beta.

The project-specific equity beta resulting from the regearing process can then be used to calculate a project-specific cost of equity using the CAPM. This can be used as the discount rate when evaluating the investment project with a discounted cash (DCF) flow investment appraisal method such as net present value or internal rate of return. Alternatively, the project-specific

cost of equity can be used in calculating a project-specific weighted average cost of capital, which can also be used in a DCF evaluation.

(c) The cost of equity is the return required by ordinary shareholders (equity investors), in order to compensate them for the risk associated with their equity investment, i.e. their investment in the ordinary shares of a company. If the risk of an investment increases, the return expected by the investor also increases. If the risk of a company increases, therefore, its cost of equity also increases.

If a company is liquidated, the order in which the claims of creditors are settled is a factor in determining their relative risk. The claims of providers of debt finance (debt holders) must be paid off before any cash can be distributed to ordinary shareholders (the owners). The risk faced by shareholders is therefore greater than the risk faced by debt holders, and the cost of equity is therefore greater than the cost of debt.

Interest on debt finance must be paid before dividends can be paid to ordinary shareholders, so the risk faced by ordinary shareholders is greater than the risk faced by debt holders, since the necessity of paying interest may mean that dividends have to be reduced.

3 (a) (i) The current operating cycle is the sum of the current inventory days and trade receivables days, less the current trade payables days.

Current inventory days = (473,400/2,160,000) x 365 = 80 days
Current trade receivables days = (1,331,500/5,400,000) x 365 = 90 days
Current trade payables days = (177,500/2,160,000) x 365 = 30 days

Current operating cycle = 80 + 90 – 30 = 140 days

Operating cycle after policy changes = 50 + 62 – 45 = 67 days

The change in the operating cycle is therefore a decrease of 73 days.

(ii) At present, the current ratio is 1,804,900/1,504,100 = 1·20 times.

The current net working capital is $300,800.

The revised figures for inventory, trade receivables, trade payables and overdraft must be calculated in order to find the current ratio after the planned working capital policy changes.

Revised inventory = 2,160,000 x 50/365 =$295,890
Revised trade receivables = 5,400,000 x 62/365 = $917,260
Revised trade payables = $2,160,000 x 45/365 = $266,301

Revised overdraft level = 295,890 + 917,260 – 266,301 – 300,800 = $646,049

Revised current assets = 295,890 + 917,260 = $1,213,150
Revised current liabilities = 266,301 + 646,049 = $912,350

Revised current ratio = 1,213,150/912,350 = 1·33 times

The effect on the current ratio is to increase it from 1·20 to 1·33 times.

(iii) The finance cost saving arises from the decrease in the overdraft from $1,326,600 to $646,049, a reduction of $680,551, with a saving of 5% per year or $34,028 per year.

(b) The key elements of a trade receivables policy are credit analysis, credit control and receivables collection.

Credit analysis
Credit analysis helps a company to minimise the possibility of bad debts by offering credit only to customers who are likely to pay the money they owe. Credit analysis also helps a company to minimise the likelihood of customers paying late, causing the company to incur additional costs on the money owed, by indicating which customers are likely to settle their accounts as they fall due.

Credit analysis, or the assessment of creditworthiness, is undertaken by analysing and evaluating information relating to a customer's financial history. This information may be provided by trade references, bank references, the annual accounts of a company or credit reports provided by a credit reference agency. The depth of the credit analysis will depend on the potential value of sales to the client, in terms of both order size and expected future trading. As a result of credit analysis, a company will decide on whether to extend credit to a customer.

Credit control
Having granted credit to customers, a company needs to ensure that the agreed terms are being followed. The trade receivables management policy will stipulate the content of the initial sales invoice that is raised. It will also advise on the frequency with which statements are sent to remind customers of outstanding amounts and when they are due to be paid. It will be useful to prepare an aged receivables analysis at regular intervals (e.g. monthly), in order to focus management attention on areas where action needs to be taken to encourage payment by clients.

Receivables collection

Ideally, all customers will settle their outstanding accounts as and when they fall due. Any payments not received electronically should be banked quickly in order to decrease costs and increase profitability. If accounts become overdue, steps should be taken to recover the outstanding amount by sending reminders, making customer visits and so on. Legal action could be taken if necessary, although only as a last resort.

(c) Foreign currency risk can be divided into transaction risk, translation risk and economic risk.

Transaction risk

This is the foreign currency risk associated with short-term transactions, such as receiving money from customers in settlement of foreign currency accounts receivable. The risk here is that the actual profit or cost associated with the future transaction may be different from the expected or forecast profit or cost. The expected profit on goods or service sold on credit to a foreign client, for example, invoiced in the foreign currency, could be decreased by an adverse exchange rate movement. Transaction risk is therefore cash exposure, since cash transactions are affected by it. This type of foreign currency risk is usually hedged.

Translation risk

This is the foreign currency risk associated with the consolidation of foreign currency denominated assets and liabilities. Movements in exchange rates can change the value of such assets and liabilities, resulting in unrealised foreign currency losses or gains when financial statements are consolidated for financial reporting purposes. These gains and losses exist only on paper and do not have a cash effect. Translation exposure is often referred to as accounting exposure. Translation exposure can be hedged using asset and liability management, but hedging this type of foreign currency risk may be deemed unnecessary.

Economic risk

This is the foreign currency risk associated with longer-term movements in exchange rates. It refers to the possibility that the present value of a company's future cash flows may be affected by future exchange rate movements, or that the competitive position of a company may be affected by future exchange rate movements. From one point of view, transaction exposure is short-term economic exposure. All companies face economic exposure and it is difficult to hedge against.

(d) Income from forward market hedge = 500,000/1·687 = $296,384

Three-month euro borrowing rate = 9/4 = 2·25%
Three-month dollar deposit rate = 4/4 = 1%

Euros borrowed now = 500,000/1·0225 = €488,998
Dollar value of this borrowing = 488,998/1·675 = $291,939
Dollar income on this deposited sum = 291,939 x 1·01 = $294,858

The forward hedge gives $1,526 more income and hence will be preferred financially by TGA Co.

4 **(a)** The dividend growth model can give a value of GXG Co at the end of the second year of not paying dividends, based on the dividends paid from the end of the third year onwards. The company has 10 million shares in issue ($5 million/50 cents nominal value) and so the total dividend proposed at the end of the third year will be $2·5 million (25 cents per share x 10m). If these dividends increase by 4% per year in subsequent years, their capital value at the end of the second year will be:

2·5/(0·09 – 0·04) = $50 million

The dividend valuation model value (the capital value of the dividends at year 0) will be:

$50/1·09^2$ = $42·1 million

The current present value of dividends to shareholders, using the existing 3% dividend growth rate:

(1·6 x 1·03)/(0·09 – 0·03) = $27·5 million

The proposal will increase shareholder wealth by 42·1 – 27·5 = $14·6 million and so is likely to be acceptable to shareholders.

(**Examiner note:** *Calculations on a per share basis could also be used to evaluate the effect of the proposal on shareholder wealth*)

(b) The cash to be raised = 3,200,000 + 100,000 = $3,300,000
The number of shares issued = 3,300,000/2·50 = 1,320,000 shares
Total number of shares after the stock market listing = 11,320,000 shares

Increase in before-tax income = 0·18 x 3·2m = $576,000
Increase in after-tax income = 576,000 x 0·8 = $460,800
Revised earnings = 2,600,000 + 460,800 = $3,060,800

Revised earnings per share = 100 x (3,060,800/11,320,000) = 27 cents per share

Current earnings per share = 100 x (2,600,000/10,000,000) = 26 cents per share

The earnings per share has increased by 1 cent per share, which existing shareholders may find acceptable. However, the balance of ownership and control will change as a result of the new shareholders, and no information has been provided about expected future dividends.

(c) Increase in before-tax income = 0·18 x 3·2m = $576,000
Revised operating profit = 576,000 + 3,450,000 = $4,026,000

Interest on new debt = 3,200,000 x 0·06 = $192,000
Revised interest = 192,000 + 200,000 = $392,000

Revised profit before tax = 4,026,000 – 392,000 = $3,634,000
Revised profit after tax = 3,634,000 x 0·8 = $2,907,200

Revised earnings per share = 100 x (2,907,200/10,000,000) = 29·1 cents per share
Earnings per share would increase by 3·1 cents per share.

Current interest cover = 3,450,000/200,000 = 17 times
Revised interest cover = 4,026,000/392,000 = 10 times

The increase in earnings per share would be welcomed by shareholders, but further information on the future of the company following the investment in research and development would be needed for a more comprehensive answer. The decrease in interest cover is not serious and the increase in financial risk is unlikely to upset shareholders.

(d) Traded bonds are debt securities issued onto the capital market in exchange for cash received by the issuing company. The cash raised must be repaid on the redemption date, usually between five and fifteen years after issue. Bonds are usually secured on non-current assets of the issuing company, which reduces the risk to the lender. In the event of default on interest payments by the borrower, the bond holders can appoint a receiver to sell the assets and recover their investment. Interest paid on the bonds is tax-deductible, which reduces the cost of debt to the issuing company. Provided the borrower continues to pay the interest, however, bond finance is a low risk financing choice by the issuer.

There are a number of differences between bond finance and a new equity issue via a placing that will influence the choice between them. Equity finance does not need to be redeemed, since ordinary shares are truly permanent finance. While bond interest is usually fixed, the return to shareholders in the form of dividends depends on the dividend decision made by the directors of a company, and so these returns can increase, decrease or be passed. Furthermore, since dividends are a distribution of after-tax profit, they are not tax-deductible like interest payments, and so equity finance is not tax-efficient like debt finance.

Venture capital is found in specific financing situations, i.e. where risk finance is needed, for example, in a management buyout. Both equity and debt finance can be part of a venture capital financing package, but the return expected on venture capital is very high because of the level of risk faced by the investor.

Fundamentals Level – Skills Module, Paper F9
Financial Management

			Marks	*Marks*
1	**(a)**	Inflated selling price per box	1	
		Sales income	1	
		Inflated total variable cost	1	
		Inflated incremental fixed costs	1	
		Tax liability	1	
		Capital allowance, years 1 to 3	1	
		Balancing allowance, year 4	1	
		Capital allowance tax benefits, years 1 to 4	1	
		Timing of tax liabilities and benefits	1	
		Incremental working capital investment	1	
		Scrap value	1	
		Discount at 12%	1	
		Calculated value for NPV	1	
		Comment on financial acceptability	1	
				14
	(b)	Discussion of nominal terms approach	2–3	
		Discussion of real terms approach	2–3	
			Maximum	5
	(c)	Identification of two financial objectives	1	
		Discussion of support for objectives of planned investment	5	
				6
				25
2	**(a)**	Calculation of historic dividend growth rate	1	
		Calculation of cost of equity using DGM	2	
		Calculation of cost of preference shares	1	
		Calculation of after-tax interest payment on bond	1	
		Setting up linear interpolation calculation	1	
		Calculation of after-tax cost of debt of bond	1	
		Calculation of after-tax cost of debt of bank loan	1	
		Calculation of market values	2	
		Calculation of WACC	2	
				12
	(b)	Ungearing proxy company equity beta	1–2	
		Averaging and regearing asset betas	1–2	
		Project-specific cost of equity using CAPM	1–2	
		Project-specific WACC	1–2	
		Appropriate reference to business risk	1	
		Appropriate reference to financial risk	1	
			Maximum	8
	(c)	Relationship between risk and return	1–2	
		Creditor hierarchy and related discussion	3–4	
			Maximum	5
				25

			Marks	Marks
3	**(a)**	Current inventory days	0·5	
		Current trade receivables days	0·5	
		Current trade payables days	0·5	
		Current operating cycle	0·5	
		Revised operating cycle	0·5	
		Reduction in operating cycle	0·5	
		Current ratio	0·5	
		Revised inventory	0·5	
		Revised trade receivables	0·5	
		Revised trade payables	0·5	
		Revised overdraft	0·5	
		Revised current ratio	0·5	
		Finance cost saving	1	
		Comment on findings	1	
				8
	(b)	Discussion of credit analysis	2–3	
		Discussion of credit control	2–3	
		Discussion of receivables collection	2–3	
			Maximum	7
	(c)	Transaction risk	2	
		Translation risk	2	
		Economic risk	2	
				6
	(d)	Income from forward market hedge	1	
		Income from money market hedge	2	
		Indication of financially preferred hedge	1	
				4
				25

		Marks	*Marks*
4	**(a)** Value of company at end of two years using DGM	2	
	Value of company at year zero	1	
	Current value of company using Dividend Valuation Model	2	
	Acceptability of option 1 to shareholders	1	
			6
	(b) Cash raised by issuing shares	0·5	
	Number of shares issued	0·5	
	Current earnings per share	0·5	
	Increase in after-tax income	1	
	Revised earnings per share	1	
	Change in earnings per share	0·5	
	Comment on acceptability of option	1	
			5
	(c) Revised operating profit	0·5	
	Revised interest	0·5	
	Revised profit after tax	0·5	
	Revised earnings per share	0·5	
	Current interest cover	0·5	
	Revised interest cover	0·5	
	Comment on earnings per share	1	
	Comment on findings	1	
			5
	(d) Discussion of bond finance	3–4	
	Discussion of equity finance via placing	3–4	
	Discussion of venture capital	3–4	
		Maximum	9
			25