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# Answers

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Section A

1 A

2 D

3 D

$$\text{Mean growth in earnings per share} = 100 \times [(35.7/30.0)^{1/3} - 1] = 5.97\% \text{ or } 6\%$$

4 A

5 D

6 B

7 A

8 C

9 D

10 B

$$\text{Market value} = (6 \times 5.971) + (105 \times 0.582) = 35.83 + 61.11 = \$96.94$$

11 C

12 D

13 C

Year	CF (\$m)	15% DF	PV (\$m)	20% DF	PV (\$m)
0	(6.5)	1.000	(6.500)	1.000	(6.500)
1	2.4	0.870	2.088	0.833	1.999
2	3.1	0.756	2.344	0.694	2.151
3	2.1	0.658	1.382	0.579	1.216
4	1.8	0.572	1.030	0.482	0.868
			<u>0.344</u>		<u>(0.266)</u>

$$\text{IRR} = 15 + [(5 \times 0.344)/(0.344 + 0.266)] = 15 + 2.82 = 17.8\%$$

14 A

15 C

$$\text{Optimum cash conversion} = (2 \times 400 \times 150,000 / (0.05 - 0.01))^{0.5} = \$54,772$$

16 A

17 C

Twelve-month forward rate =  $1.415 \times (1.02/1.018) = \text{€}1.418$  per \$1

18 B

19 D

Cost of equity =  $4 + (1.2 \times 5) = 4 + 6 = 10\%$

WACC =  $(10 \times 0.7) + (6 \times 0.3) = 7 + 1.8 = 8.8\%$

20 A

Net asset value (NAV) =  $140\text{m} - 15\text{m} - 20\text{m} = \$105\text{m}$

Number of ordinary shares =  $25\text{m}/0.5 = 50\text{m}$  shares

NAV per share =  $105\text{m}/50\text{m} = \$2.10$  per share

## Section B

1 (a) **Forward market hedge:**

The dollar value of a forward market hedge in six months' time can be calculated:

Future value =  $750,000/2.412 = \$310,945$

**Money market hedge:**

Rose Co is expecting a euro receipt in six months' time and it can hedge this receipt in the money markets by borrowing euros to create a euro liability. These euros can be converted into dollars at spot and then placed on deposit for six months.

Euro borrowing rate for 6 months =  $8.0/2 = 4\%$

Dollar deposit rate for 6 months =  $2.0/2 = 1\%$

Euros to be borrowed now =  $750,000/1.04 = \text{€}721,154$

Dollar value of these euros at spot =  $721,154/2.349 = \$307,005$

Future value of dollar deposit =  $307,005 \times 1.01 = \$310,075$

The forward market hedge would be better by  $310,945 - 310,075 = \$870$  and would therefore be preferred on financial grounds by Rose Co.

(b) A forward rate agreement (FRA) can fix the borrowing rate on a sum of money for an agreed period starting on an agreed future date.

A company can use an FRA to manage interest rate risk because the FRA fixes the future borrowing rate for an agreed period, and hence fixes the company's future borrowing cost.

If the future interest rate paid by the company turns out to be higher than the borrowing rate in the FRA, the bank will compensate the company with the difference between the two rates applied to the agreed sum for the agreed period. If the future interest rate paid by the company turns out to be less than the borrowing rate in the FRA, the opposite occurs and the company compensates the bank. The net effect is that the company is locked into the borrowing rate specified in the FRA.

Because the company is locked into the FRA borrowing rate, the FRA does not allow the company to benefit from favourable interest rate movements.

The bank which is a party to the FRA does not need to be the same bank which offers the funds to be borrowed.

2 (a) As the payout ratio has increased from 40.0% in the year to March 2014 to 41.4% in the year to March 2015, the total dividend has increased from \$5,280,000 ( $13,200,000 \times 0.4$ ) for the year to March 2014 to \$5,729,760 ( $13,840,000 \times 0.414$ ) for the year to March 2015. This represents dividend growth of 8.52% ( $5,729,760/5,280,000$ ).

Provided the future dividend growth rate is expected to be similar to the historic dividend growth rate, the calculated dividend growth rate of 8.52% can be used in the dividend growth model.

The equity market value using the dividend growth model is therefore:

$(5,729,760 \times 1.0852)/(0.125 - 0.0852) = \$156,229,537$  or \$156.2 million.

**Examiner's Note:**

Full credit could be obtained by calculating the equity market value from a share price calculated using the dividend growth model, although calculating a share price was not necessary.

Number of shares =  $8,000,000/0.5 = 16,000,000$  shares

Earnings per share =  $100 \times 13,840,000/16,000,000 = 86.5$  cents per share

Dividend per share =  $86.5 \times 0.414 = 35.8$  cents per share

Share price =  $(35.8 \times 1.0852)/(0.125 - 0.0852) = 976$  cents or \$9.76 per share

Equity market value =  $9.76 \times 16,000,000 = \$156.2$  million

- (b) Equity market value using the earnings yield approach:

Earnings/earnings yield =  $13,840,000/0.082 = \$168,780,488$  or \$168.8 million

- (c) Cash-flow valuation models tend to be preferred to profit-based valuation models and so the dividend growth model (DGM) could be preferred to the earnings yield method (EYM), as the DGM uses cash, while the EYM uses profit.

The DGM has used information specific to Chad Co, whereas the earnings yield method has used an average earnings yield relating to companies which are similar to Chad Co. The DGM valuation is therefore likely to be more relevant to Chad Co than the EYM valuation, as Chad Co is likely to be different from the average company in its business area.

The two valuation methods relate to different valuation purposes in an acquisition context. The dividend growth model values a minority shareholding in a target company, while the earnings yield valuation gives a value from the perspective of the acquirer, provided the earnings yield used is appropriate.

Both the DGM and the EYM assume that relevant valuation variables, such as the dividend growth rate, the cost of equity and the earnings yield, will remain constant in the future in perpetuity. This is very unlikely to be true and reduces the usefulness of the two valuation methods.

- 3 (a) The factor's offer will be financially acceptable to Widnor Co if it results in a net benefit rather than a net cost.

	\$	
Current trade receivables	4,458,000	
Revised trade receivables = $26,750,000 \times 35/360 =$	2,600,694	
Reduction in trade receivables	<u>1,857,306</u>	
	\$	\$
Reduction in financing cost = $1,857,306 \times 0.05 =$	92,865	
Saving in bad debts = $26,750,000 \times 0.01 \times 0.7 =$	187,250	
Reduction in administration costs	<u>50,000</u>	
Benefits		330,115
Increase in financing cost = $2,600,694 \times 0.8 \times (0.07 - 0.05) =$	41,611	
Factor's annual fee = $26,750,000 \times 0.0075 =$	<u>200,625</u>	
Costs		(242,236)
Net benefit		<u>87,879</u>

The factor's offer is financially acceptable to Widnor Co as it results, on current figures, in a net benefit of \$87,879 per year.

- (b) The creditworthiness of potential customers can be assessed from a range of different sources of information. References are useful in this respect, and potential customers should supply a bank reference and a trade or other reference when seeking credit on purchases. Another source of information is the credit rating of the potential customer, which can be checked by a credit rating agency or credit reference agency. For larger potential customers, a file can be opened where additional information can be located, evaluated and stored, such as the annual report and accounts of the potential customer, press releases and so on.

- 4 (a) Rights issue price =  $3.50 \times 0.8 = \$2.80$  per share

Grenarp Co currently has 20 million shares in issue ( $\$10m/0.5$ )

The number of new shares issued =  $20m/5 = 4$  million shares

Cash raised by the rights issue before issue costs =  $4m \times 2.80 = \$11,200,000$

Net cash raised by the rights issue after issue costs =  $11,200,000 - 280,000 = \$10,920,000$

Revised number of shares =  $20m + 4m = 24$  million shares

Market value of Grenarp Co before the rights issue =  $20,000,000 \times 3.50 = \$70,000,000$

Market value of Grenarp Co after the rights issue =  $70,000,000 + 10,920,000 = \$80,920,000$

Theoretical ex rights price per share =  $80,920,000/24,000,000 = \$3.37$  per share

(Alternatively, issue costs are \$0.07 per share (280,000/4m) and this is a 1 for 5 rights issue, so the theoretical ex rights price =  $(5 \times 3.50 + (2.80 - 0.07))/6 = 20.23/6 = \$3.37$  per share)

Redemption price of loan notes =  $104 \times 1.05 = \$109.20$  per loan note

Nominal value of loan notes redeemed =  $10,920,000/(109.20/100) = \$10,000,000$

Before-tax interest saving =  $10,000,000 \times 0.08 = \$800,000$  per year

After-tax interest saving =  $800,000 \times (1 - 0.3) = \$560,000$  per year

Earnings after redeeming loan notes =  $8,400,000 + 560,000 = \$8,960,000$  per year

Revised earnings per share =  $100 \times (8,960,000/24,000,000) = \$0.373$  per share

Price/earnings ratio of Grenarp Co before the rights issue =  $3.50/0.42 = 8.33$  times

This price/earnings ratio is not expected to be affected by the redemption of loan notes

Share price of Grenarp Co after redeeming loan notes =  $8.33 \times 0.373 = \$3.11$  per share

The wealth of shareholders of Grenarp Co has decreased as they have experienced a capital loss of \$0.26 per share (\$3.37 – \$3.11) compared to the theoretical ex rights price per share.

- (b) The capital structure is considered to be optimal when the weighted average cost of capital (WACC) is at a minimum and the market value of a company is at a maximum. The goal of maximising shareholder wealth might be achieved if the capital structure is optimal.

The question of whether Grenarp Co might achieve its optimal capital structure following the rights issue can be discussed from a theoretical perspective by looking at the traditional view of capital structure, the views of Miller and Modigliani on capital structure, and other views such as the market imperfections approach. It is assumed that a company pays out all of its earnings as dividends, and that these earnings and the business risk of the company are constant. It is further assumed that companies can change their capital structure by replacing equity with debt, and vice versa, so that the amount of finance invested remains constant, irrespective of capital structure. The term 'gearing up' therefore refers to replacing equity with debt in the context of theoretical discussions of capital structure.

#### **Traditional view**

The traditional view of capital structure, which ignores taxation, held that an optimal capital structure did exist. It reached this conclusion by assuming that shareholders of a company financed entirely by equity would not be very concerned about the company gearing up to a small extent. As expensive equity was replaced by cheaper debt, therefore, the WACC would initially decrease. As the company continued to gear up, shareholders would demand an increasing return as financial risk continued to increase, and the WACC would reach a minimum and start to increase. At higher levels of gearing still, the cost of debt would start to increase, for example, because of bankruptcy risk, further increasing the WACC.

#### **Views of Miller and Modigliani**

Miller and Modigliani assumed a perfect capital market, where bankruptcy risk does not exist and the cost of debt is constant. In a perfect capital market, there is a linear relationship between the cost of equity and financial risk, as measured by gearing. Ignoring taxation, the increase in the cost of equity as gearing increases exactly offsets the decrease in the WACC caused by the replacement of expensive equity by cheaper debt, so that the WACC is constant. The value of a company is therefore not affected by its capital structure.

When Miller and Modigliani included the effect of corporate taxation, so that the after-tax cost of debt was used instead of the before-tax cost of debt, the decrease in the WACC caused by the replacement of expensive equity by cheaper debt was greater than the increase in the cost of equity, so that the WACC decreased as a company geared up. The implication in terms of optimal capital structure was that a company should gear up as much as possible in order to decrease its WACC as much as it could.

#### **Market imperfections view**

When other market imperfections are considered in addition to the existence of corporate taxation, the view of Miller and Modigliani that a company should gear up as much as possible is no longer true. These other market imperfections relate to high levels of gearing, bankruptcy risk and the costs of financial distress, and they cause the cost of debt and the cost of equity to increase, so that the WACC increases at high levels of gearing.

#### **Grenarp Co**

The question of whether Grenarp Co might achieve its optimal capital structure following the rights issue can also be discussed from a practical perspective, by considering if increasing the gearing of the company would decrease its WACC. This would happen if the marginal cost of capital of the company were less than its WACC. Unfortunately, there is no information provided on the marginal cost of capital of Grenarp Co, although its gearing is not high. Before the rights issue, the debt/equity ratio of Grenarp Co was 35% on a book value basis and 45% on a market value basis, while after the redemption of loan notes the debt/equity ratio would fall to 21% on a book value basis and 28% on a market value basis.

5 (a) Calculation of expected net present value

Year	1	2	3	4
	\$000	\$000	\$000	\$000
Revenue	4,524	7,843	13,048	10,179
Variable cost	(2,385)	(4,200)	(7,080)	(5,730)
Contribution	2,139	3,643	5,968	4,449
Overhead	(440)	(484)	(532)	(586)
Cash flow before tax	1,699	3,159	5,436	3,863
Tax	(510)	(948)	(1,631)	(1,159)
Depreciation benefits	338	338	338	338
Cash flow after tax	1,527	2,549	4,143	3,042
Scrap value				500
Project cash flow	1,527	2,549	4,143	3,542
Discount at 11%	0.901	0.812	0.731	0.659
Present values	1,376	2,070	3,029	2,334
		\$000		
PV of future cash flows		8,809		
Initial investment		(5,000)		
Expected net present value (ENPV)		3,809		

The investment project has a positive ENPV of \$3,809,000. This is a mean or average NPV which will result from the project being repeated many times. However, as the project is not being repeated, the NPVs associated with each future economic state must be calculated as it is one of these NPVs which is expected to occur. The decision by management on the financial acceptability of the project will be based on these NPVs and the risk associated with each one.

**Workings**

Mean or average selling price =  $(25 \times 0.35) + (30 \times 0.5) + (35 \times 0.15) = \$29$  per unit

Year	1	2	3	4
Inflated selling price (\$ per unit)	30.16	31.37	32.62	33.93
Sales volume (units/year)	150,000	250,000	400,000	300,000
Sales revenue (\$000/year)	4,524	7,843	13,048	10,179
Year	1	2	3	4
Inflated overhead (\$000/year)	440	484	532	586

Total tax-allowable depreciation =  $5,000,000 - 500,000 = \$4,500,000$

Annual tax-allowable depreciation =  $4,500,000/4 = \$1,125,000$  per year

Annual cash flow from tax-allowable depreciation =  $1,125,000 \times 0.3 = \$337,500$  per year

- (b) Sensitivity analysis assesses the extent to which the net present value (NPV) of an investment project responds to changes in project variables. Two methods are commonly used: one method determines the percentage change in a project variable which results in a negative NPV, while the other method determines the percentage change in NPV which results from a fixed percentage change (for example, 5%) in each project variable in turn. Whichever method is used, the key or critical project variables are identified as those to which the NPV is most sensitive, for example, those where the smallest percentage change results in a negative NPV. Sensitivity analysis is therefore concerned with calculating relative changes in project variables.

When discussing risk in the context of investment appraisal, it is important to note that, unlike uncertainty, risk can be quantified and measured. The probabilities of the occurrence of particular future outcomes can be assessed, for example, and used to evaluate the volatility of future cash flows, for example, by calculating their standard deviation. The probabilities of the future economic states in the assessment of the investment project of Hraxin Co are an example of probability analysis and these probabilities can lead to an assessment of project risk.

Sensitivity analysis is usually studied in investment appraisal in relation to understanding how risk can be incorporated in the investment appraisal process. While sensitivity analysis can indicate the critical variables of an investment project, however, sensitivity analysis does not give any indication of the probability of a change in any critical variable. Selling price may be a critical variable, for example, but sensitivity analysis is not able to say whether a change in selling price is likely to occur. In the appraisal of the investment project of Hraxin Co, the probabilities of different selling prices arising with related economic states have come from probability analysis, not from sensitivity analysis.

Sensitivity analysis will not therefore directly assist Hraxin Co in assessing the risk of the investment project. However, it does provide useful information which helps management to gain a deeper understanding of the investment project and which focuses management attention on aspects of the investment project where problems may arise.

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

**June 2015 Marking Scheme**

	<i>Marks</i>	<i>Marks</i>
<b>Section A</b>		
<b>1–20</b> Two marks per question		<b>40</b>
<b>Section B</b>		
<b>1 (a)</b> Dollar value of forward market hedge	1	
Euro borrowing rate	1	
Dollar deposit rate	1	
Dollar value of money market hedge	1	
Decision as to best hedge	<u>1</u>	
		5
<b>(b)</b> Explanation of forward rate agreement	1	
Relevant discussion	<u>4</u>	
		<u>5</u>
		<b><u>10</u></b>
<b>2 (a)</b> Dividend growth rate	1	
Equity market value using dividend growth model	<u>2</u>	
		3
<b>(b)</b> Equity market value using earnings yield method		2
<b>(c)</b> Cash-based and profit-based valuation methods	1–2	
Information used by valuation methods	1–2	
Other relevant discussion	<u>1–2</u>	
	Maximum	<u>5</u>
		<b><u>10</u></b>
<b>3 (a)</b> Reduction in trade receivables	1	
Reduction in financing cost	1	
Reduction in administration costs	1	
Saving in bad debts	1	
Increase in financing cost	1	
Factor's annual fee	1	
Advice on acceptance of factor's offer	<u>1</u>	
		7
<b>(b)</b> Bank and other references	1	
Credit rating	1	
Other relevant discussion	<u>1</u>	
		<u>3</u>
		<b><u>10</u></b>

	<i>Marks</i>	<i>Marks</i>
<b>4 (a)</b> Rights issue price	0.5	
New shares issued	0.5	
Net cash raised by rights issue	0.5	
Theoretical ex rights price per share	1	
Buy-back price of loan notes	0.5	
Nominal value of loan notes redeemed	1	
Before-tax interest saving	0.5	
After-tax interest saving	0.5	
Revised earnings	0.5	
Revised earnings per share	0.5	
Revised share price using price/earnings ratio method	1	
Comment on effect of redemption on shareholders' wealth	<u>1</u>	
		8
<b>(b)</b> Traditional view of capital structure	1-3	
Miller and Modigliani views of capital structure	1-3	
Other relevant discussion	<u>1-3</u>	
	Maximum	<u>7</u>
		<b><u>15</u></b>
<b>5 (a)</b> Mean selling price per unit	0.5	
Inflated selling price per unit	1	
Inflated revenue	1	
Inflated overhead	1	
Tax liabilities	1	
Timing of tax liabilities	1	
Tax-allowable depreciation benefits	1	
Scrap value	0.5	
Present values of future cash flows	1	
Comment on financial acceptability	<u>1</u>	
		9
<b>(b)</b> Explanation of sensitivity analysis	1-3	
Explanation of risk in investment appraisal	1-2	
Discussion of sensitivity analysis and risk	<u>1-3</u>	
	Maximum	<u>6</u>
		<b><u>15</u></b>