Answers

Tutorial note: These model answers are considerably longer and more detailed than would be expected from any candidate in the examination. They should be used as a guide to the form, style and technical standard (but not in length) of answer that candidates should aim to achieve. However, these answers may not include all valid points mentioned by a candidate – credit will be given to candidates mentioning such points.

1 (a)   A short form cash flow statement is as follows (note: a more detailed analysis of operating cash flow is not required)

Operating profit	108·8
Add depreciation	28·0
	136·8
Add change in:	
trade payables	1·1
trade receivables	3·5
inventories	0·5
Operating cash flow	141·9
less interest	–2·3
less taxation	–25·6
Free cash flow before reinvestment	114·0
CAPEX	–80·0
Dividends	–28·0
Financing	–10·0
Net cash change	–4·0

(b)   Dividend capacity is determined by the free cash flow available to equity investors after net reinvestment. Reinvestment is that which is required to maintain the operating capacity of the business at the planned rate of growth specified by management as necessary to achieve the firm's strategic goals. Where new capital has been introduced this is deducted from the capital expenditure during the year to give the amount of investment financed from the free cash flow.

The free cash flow before reinvestment is $114 million which with CAPEX of $80 million implies a reinvestment rate of 0·70. The maximum dividend capacity is $24 million given the intention to repay $10 million of debt and excluding any further expansion in the company's working capital requirement. However, given that 18 days of cost of sales is unfunded this implies that $(18/365 \times (143·2 - 28·0)) = \$5·68$ million of extra capital would be required to finance the working capital cycle reducing the dividend capacity to $24m – $5·68m = $18·32 million.

Given the actual dividend is $28 million this implies that the firm has over distributed given its free cash generation during the year and its necessary reinvestment. The shortfall has been taken from the firm's cash reserves. Whether the firm has over distributed in terms of its capital account depends upon the firm's level of earnings for the year and its target rate of retention.

(c)   The necessary calculations for this report are as follows:

Cost of equity 2007 using the capital asset pricing model

$E(R_e) = R_F + \beta_{i,m} \times ERP$
$E(R_e) = 3\% + 1·4 \times 5\%$
$E(R_e) = 10\%$

The firm's market gearing ratio is:

$$\text{market gearing (2007)} = \frac{45}{45 + 25 \times 4 \times 16·2} = 0·027$$

and the weighted average cost of capital is:

$WACC\ (2007) = (1 - 0·027) \times 10\% + 0·027 * 5\% * 0·7 = 9·82\%$

On the basis of this the EVA for both years is:

$EVA = NOPAT - WACC \times \text{Capital employed}$
$EVA\ (2007) = (102·3 \times ·7) - 0·0982 \times (179·0 + 45) = \$49·6$ million

Or 22·1% on capital employed and

$EVA\ (2008) = 108·8 * ·7 - 0·0982 \times (253·9 + 35) = \$47·79m$
Or 16·54% of the capital employed in the business

The return on capital employed (defined as profit before interest and tax over capital employed) is:

ROCE (2007) = 51·2%
ROCE (2008) = 42·4%

Report to Management

On the basis of the forecast for the next 12 months we estimate that profit before tax should rise from the current level of $102·3 million per annum to $108·6 million an increase of 6·16%. An estimate of the Economic Value Added for 2007 and 2008 (projected) shows a small decrease from $49·60million to $47·79 million which is accounted for by an increase in the expected NOPAT figure from $71·61 million to $76·2 million offset by an increased capital charge incurred by the expected increase in the book value of capital employed and the increase in the firm's cost of capital. Overall, the EVA return on capital employed is expected to fall from 22·1% to 16·54% and the EVA margin from 22·54% to 18·24%. This deterioration in the EVA figure is attributable to an increase to $36·1 million in the other operating costs of the business and an increase in the equity capital of the firm which on the current projections will not lead to a commensurate increase in the firm's value generation. A similar picture is presented by the expected decline in the firm's return on capital employed from 51·2% to 42·4%.

It is likely that the market will regard an outcome in line with our projections as a deterioration in the economic performance of the firm and this will inevitably have a negative impact upon both price of the firm's equity and the company's cost of capital. In order to surmount this difficulty the board should consider why the increased capital base of the firm (up by a projected 19·43%) is not being fully reflected in terms of increased turnover, profitability and value generation. Part of the explanation lies in the expected rate of increase of turnover which is expected to grow at a slower rate than the level of capital invested. However there is also an anticipated deterioration in margins (operating profit margin deteriorates from 39% to 37·7%) suggesting that further measures to control costs is necessary.

The underlying difficulty we face is the speed with which new capital is generating returns. This is largely governed by our actual reinvestment. Cash generation is well ahead of our planned rate of reinvestment and servicing of finance. In the medium term we need to review the use of this cash either in terms of new capital projects, acquisitions or repayment of capital.

2 (a) The first step in the valuation is to calculate each company's weighted average cost of capital. The cost of capital is calculated post tax and using the relevant market values to calculate the market gearing ratio.

	Burcolene	PetroFrancais
Cost of equity (using the CAPM, 3% risk free and 4% equity risk premium)	= ·03 + 1·85 × 0·04 = 0·104	= ·03 + 0·95 × 0·04 = 0·068
Market gearing	= 3·3/(3·3 + 9·9) = 0·25	5·8/(5·8 + 6·7) = 0·464
Cost of debt	= 0·03 + 0·016 = 0·046	= 0·03 + 0·03 = 0·06
WACC	= 0·75 × ·104 + ·25 × ·046 × 0·7 = 0·0861	= 0·536 × ·068 + ·464 × ·06 × 0·75 = 0·0573

Note: there may be rounding differences.

The core valuation formula is:

$$V_0 = \frac{FCF_1}{WACC - g}$$

As free cash flow is NOPAT – net reinvestment then:

$$V_0 = \frac{FCF_1}{WACC - g} = \frac{(NOPAT - \text{net reinvestment})_1}{WACC - g}$$

The figures quoted are for NOPAT – reinvestment for the current year. For the two companies the value before either pension or share option scheme adjustments is therefore (in $):

$$V_B = \frac{450 \times (1·05)}{0·0861 - 0·05} = \$13·107bn$$

and

$$V_P = \frac{205 \times (1·04)}{0·0573 - 0·04} = \$12·303bn$$

However, both company values will need to be reduced by the relevant charge for the outstanding options and the pension deficit. Using the fair value approach the value of each option outstanding is given by:

Option value = intrinsic value + time value
Option value = (actual price – exercise price) + time value
Option value = 29·12 – 22·00 + 7·31 = $14·43

(the actual price is given by the total value of equity $9·9 billion/340 million = $29·12 per share)

The number of options likely to be exercised:

options $= 25 \cdot 4\text{m} \times (1 - 0 \cdot 05)^3 \times 0 \cdot 8 = 17 \cdot 42$ million

Which gives a value of options outstanding $= \$251 \cdot 4\text{m}$

And an estimated market valuation of Burcolene of:

$V_B = \$13 \cdot 107\text{bn} - \$251 \cdot 35\text{m} = \$12 \cdot 855\text{bn}$

The value of PetroFrancais is much more straightforward being:

$V_P = \$12 \cdot 303\text{bn} - \$430\text{m} = \$11 \cdot 873\text{bn}$

(b)   Burcolene

Report to management

Subject: Valuation and Financial Implications of an Acquisition of PetroFrancais

This is potentially a type three acquisition where both the firm's exposure to business risk and financial risk change. As a consequence the value of the combined entity will depend upon the post acquisition values of the component cash streams: (i) the cash flow from the existing business; (ii) the cash flow from the acquired business and (iii) any synergistic cash flows less the cost of acquisition. However, estimating the value of these cash flows relies upon an estimate of the post acquistion required rate of return – which cannot be estimated until we know the value of the component cash flows. This problem requires an iterative solution and which can be solved using a spreadsheet package.

Validity of the Free Cash Flow to Equity Model

Our estimates of the value using NOPAT as a proxy for free cash flow produces values that are reasonably close to the current market valuation of both companies. The models value Burcolene at $12·855 billion and PetroFrancais at $11·873 billion compared with current market valuations of $13·1 billion and $12·5 billion respectively. The estimation error is 1·9% and 5·3% respectively. Although minor the differences can be explained by any of the following:

–   The model used may mis-specify the market valuation process. In either case NOPAT may not be a sufficiently close approximation to each firm's free cash flow.
–   The underpinning models in the cost of capital calculations may not be valid. The capital asset pricing model, for examples, does not capture fully all the risk elements that are priced in competitive markets.
–   The estimates of growth may be overoptimistic (both valuations are highly sensitive to variation in the implied level of growth).
–   The markets may have reacted positively to rumours of an acquisition.
–   The capital markets may be inefficient.

However, on the basis of this preliminary analysis, the low levels of modelling error suggest that the NOPAT based model should form the basis for valuing a combined business.

Deriving a bid price:

In preparation of an offer, a due diligence process should, as part of its brief, consider the likely growth of each cash stream within the context of the combined business and the variability associated with the future growth rates of each cash stream. This information could then be used to estimate the firm's future cash flows (i) to (iii) above using a cost of capital derived from the current required rates of return and market values. An iterative procedure can then be employed to bring the derived values into agreement with those used to estimate the firm's cost of capital. This valuation less the cost of acquisition and the firm's current debt gives the post acquisition equity value. The maximum price that should be paid for PetroFrancais is that which leaves the equity value of Burcolene unchanged. This estimation process whilst procedurally complex does reinforce a key point with type III acquisitions that the sum of the equity valuation of both parties is not a good indication of the value of the combined business.

Providing the management of Burcolene can come to a reliable valuation of the combined business then, providing they remain within the bid-price parameters, the acquisition should increase shareholder value. Good valuation methods should capture the benefits and the consequential costs of combined operation. It is important that management recognises this point and do not double count strategic opportunities when negotiating a bid price. In this case, improving equity value for the Burcolene investors depends upon a number of factors. A simulation of the most important parameters in the valuation model: forward growth, the cost of equity, default premiums and the cost of debt should allow Burcolene to estimate the likely equity value at risk given any chosen bid price. A simulation would also provide an estimate of the probability of a loss of equity value for Burcolene's investors at the chosen bid price.

Implications for gearing and cost of capital:

Financing an acquisition of this magnitude through debt will raise the book gearing of the business although its impact upon the market gearing of the firm is less easy to predict. Much depends on the magnitude of any surplus shareholder value generated by the combination and how it is distributed. An acquisition such as this will increase market gearing if the benefits accrue to the target shareholders. The reverse may occur if the bulk of the acquisition value accrues to the Burcolene investors. Similarly the impact upon the firm's overall cost of capital, the impact of the tax shield and the exposure to default risk again all depend upon the agreed bid price and the distribution of acquisition value between the two groups of investors.

3 (a) This is a straightforward application of the Black and Scholes option pricing model. Each of the input components is stated in the question:

Current price = Present Value of the Project = $28 million
Exercise price = capital expenditure = $24 million
Exercise date = 2 years (or 500 trading days)
Risk free rate = 5%
Volatility = 25%

Using the formula as specified:

$$d_1 = \frac{\ln\left(\frac{28}{24}\right) + \left(0{\cdot}05 + 0{\cdot}5 \times 0{\cdot}25^2\right) \times 2}{0{\cdot}25 \times \sqrt{2}} = 0{\cdot}8956$$

$$d_2 = 0{\cdot}8956 - 0{\cdot}25 \times \sqrt{2} = 0{\cdot}5421$$

The areas under the normal curves for these two values are $N(d_1) = 0{\cdot}8147$ and $N(d_2) = 0{\cdot}7061$.

Using the derived values for $N(d_1)$ and $N(d_2)$ the value of the call option on the value represented by this project is as follows:

$$c = 0{\cdot}8147 \times 28 - 0{\cdot}7061 \times 24 \times e^{-0{\cdot}05 \times 2} = \$7{\cdot}48 \text{ million}$$

This implies that at the current time the project has a value equal to its net present value plus the value of the call option to delay, i.e., $11·48 million. The additional value arises because the delay option allows the company to avoid the downside element of risk.

(b) Digunder Ltd

Housing Development at Newtown

This project has a net present value of $4million on a capital expenditure of $24 million which whilst significant has a volatility estimate of 25% of the present value per annum. This volatility is brought about by uncertainties about Government's intentions with respect to the Bigcity–Newtown transport link and the consequential impact upon property values. Currently, the project presents substantial value at risk and there is a high likelihood that the project will not be value generating. To surmount this, an estimate is provided of the value of the option to delay construction for two years until the Government's transport plans will be made known.

The option to delay

The option to delay construction is particularly valuable in this case. It eliminates much of the downside risk that the project does not generate the cash flows expected and it gives us the ability to proceed at a point in time most favourable to us. The nature of the delay option is that it is more valuable the greater the volatility of the underlying cash flows and the greater the time period before we are required to exercise.

The valuation of the option to delay has been undertaken using the Black and Scholes model which members have been briefed about with respect to fair value accounting practices under the International Financial Reporting Standards. The model has some limiting assumptions relating to the underlying nature of the cash flows and our ability to adjust our exposure to risk as time passes. In reality, the use of this type of modelling is more appropriate for financial securities that are actively traded. Our use of the model is an approximation of the value of the flexibility inherent in this project and although the model will not have the precision found in its security market applications it does indicate the order of magnitude of the real option available. A positive value of $11·5 million is suggested by the model underlying the considerable benefit in delay.

In interpreting this valuation it is important to note that the actual project present value at commencement could be significantly larger than currently estimated and will certainly not be less than zero (otherwise we will not exercise the option to build). The additional value reflects the fact that downside risk is eliminated by our ability to delay the decision to proceed.

On the basis of our valuation the option to delay commencement of the project should be taken and investment delayed until the Government's intention with respect to transport links becomes clearer. On this basis we would place a value of $11·5 million on the project including the delay option.

(c) The Black and Scholes model makes a **number of assumptions** about the underlying nature of the pricing and return distributions which may not be valid with this type of project. More problematically it assumes that continuous adjustment of the hedged position is possible and that the option is European style. Where the option to delay can be exercised over any set period of time up to the exercise date the Black and Scholes model will cease to be accurate. For a call option, such as the option to delay, then the level of inaccuracy is likely to be quite low especially for options that are close to the money. Given that an option always has time value it will invariably be in the option holder's interest to wait until exercise date before exercising his or her option. However, in those situations where the level of accuracy is particularly important, or where it is suspected that the Black and Scholes assumptions do not hold, then the binomial option pricing approach is necessary.

4 (a) Agenda for change

Over recent years, the competitiveness of our business has been reduced by a number of factors not least the significant reductions in defence spending in our constituent markets. Over this time we have introduced new technologies through acquisition and have not engaged in significant research and development on our own account. Our current position is one of significant strength: we have substantial cash reserves and cash flow generation is still strong. Our gearing at 12% of capital is very low and this combined with our earnings history and liquidity gives us a high credit rating and hence a relatively low cost of capital. Our weakness is our lack of investment in new projects and our lack of R&D to support such investment. In this position we are exposed to the risk of a hostile bid by one of the many companies which do have substantial R&D but are chronically short of liquidity for future developments. I propose the following alternatives for discussion. These alternatives are not mutually exclusive:

Alternative 1:

Given that building a viable R&D ability would take many years of investment and development that would not appear to be a route to follow. However, we do have the financial resources to acquire a competitor who does have strong R&D in relevant technologies. This would achieve two ends, it would reduce the risk of predatory attack – there is substantial evidence that companies who acquire are less likely to be acquired themselves – it would eliminate one part of the competition and it would give us the capability for development that we do not currently have. The downside is if the perceived benefits do not materialise and shareholder value is lost. We may also lose shareholder value if we do not get the level of our bid right and in that regard much will depend on our investigation of potential targets.

Alternative 2:

We work harder at our current strategy seeking key technology targets at the best price and redoubling efforts to manage our own cost base. In our industry cost has become a strategic tool and we have not invested in advanced manufacturing technology to the extent of some of our competitors. In a contract build environment it is important to achieve high levels of efficiency within our matrix structure and to minimise the dysfunctional aspects of this type of operational management. To this end we should consider making projects responsible for the labour they utilise at current market rates and to establish a coherent project based budgeting and cost control system.

Alternative 3:

We recognise that our future cash generation is based upon a set of current projects of finite life and that we are moving into a phase of the company's life where new positive net present value projects are unlikely to be found. Our recent history suggests that we do have agency problems in that there are lower level managers who have championed projects which have not generated the promised returns and this is indicative of a situation where the market opportunities are very limited and net present values have been competed down to zero. In this situation one option is to return cash to shareholders through enhanced dividends or share repurchase schemes. The latter has the advantage that it does not tie us to payout commitments in the future.

Alternative 4:

We recognise that we have a shortage of managerial talent at different levels and that this has been brought about by relatively low levels of remuneration compared with the rest of the sector. Executive remuneration is not just about salary levels but we may wish to consider a stock option scheme where managers are rewarded for the delivery of positive net present value investments through the resulting increase in share price. This may well have the desirable effect of reducing the agency loss through overselling the merits of projects and overstating potential returns.

(b) The key element of this case is that this company is no longer able to find positive net present value projects and as a result its rate of growth is slowing and may, very soon, start to decline. The engine of growth would appear to be new technology and superior management practice in the management and control of projects and their costs. However, the company has no effective R&D expertise and its scope for technology led acquisitions appears to be very limited.

The ethical issue here is that if a company is no longer able to use its owner's cash then it should return money to its investors and not use it to enhance managerial rewards and perks. There is only one justification for increasing levels of executive remuneration and that is that those managers are better motivated to create the high levels of growth that lead to increased shareholder value. There are some who would argue that maximising shareholder value is a constrained objective and that the firm owes a duty to other stakeholders such as employees, managers, suppliers and customers. However, overriding this is the efficiency argument. By returning cash to shareholders, the effective operation of the capital based system ensures that they have at their disposal those cash resources and can make their own judgements about the most efficient use of their resources – to the greater benefit of the stakeholders of those businesses in which they choose to invest. The ethical arguments are therefore based upon both social policy and property rights. Social policy is involved in that the efficient operation of market economies and the maximisation of social welfare and property rights in that the surplus value within a company belongs to its investors both legally and morally.

Depending upon the situation options that increase shareholder return either through the maximisation of the firm's value, or by returning cash to them for new investment elsewhere are to be preferred.

The case also raises a question mark concerning the firm's accounting practice and the use of defensive accounting policies. If the ratio of EBITDA to operating cash flow is consistently less than one for a growing firm this would suggest that the company is deliberately hiding earnings. There are a number of reasons for this: it may be that the firm is attempting to

smooth its earnings figures in order to present more consistent performance measures over the years or it is hiding earnings in order to suppress pressure from various other stakeholders for higher wages or other forms of compensation. It may be that the company is also trying to present a relatively low earnings history as part of its pricing negotiations. However, this type of earnings management strategy is self correcting in the longer run and it is doubtful to what extent the market is fooled. The ethical dimension arises if this represents an intention to deceive rather than a function of the firm's type of business and the constraints of the GAAP.

Finally, given the ethical requirement to act responsibly it is also important to consider the environmental issues presented by the case. There is an argument that operational economy and the efficient use of resources has an environmental dimension in as far as a given level of growth can be achieved with a given level of inputs. However, the case also reveals that the company has been fined for allowing untreated discharge into a local river. As social concern about the environmental impact of industry increases, the regulation of waste and the punishments for breaches of environmental security are likely to become more and more severe. If for no other reason than the protection of the shareholders' interest the company should make the necessary investment to control its effluent discharge. It should also seek to minimise energy consumption across all its operations.

5 (a) The coupon rate on the new debt

The coupon rate should be the same as the yield for four-year debt at 6%. If the firm's bankers have overestimated the credit risk and set the spread too high, then a coupon of 6% will result in the debt being issued at a premium in the market. If they have set it too low then the debt will not be fully taken up and the underwriters will have to issue it at a discount. The investment banks suggest that at a yield and hence a coupon of 6% that this would guarantee that the issue would be taken up by their institutional clients. On this basis the firm may wish to ask for an underwriting agreement to that effect although there would inevitably be a charge for this.

(b) Impact of the new debt upon the company's market valuation and its cost of debt

The issue of the new debt can only be achieved at the cost of a reduction in our company's credit rating and/or a consequent increase in its cost of debt capital.

Using our current market gearing ratio the current amount of debt in issue is calculated as follows:

$$gearing = \frac{V_d}{V_e + V_d}$$

$$0.25 = \frac{V_d}{1.2 + V_d}$$

$$V_d = \frac{0.25 \times 1.2}{0.75} = \$0.4 \text{ billion}$$

Thus, the existing market value of our company debt is \$400 million. Given that the coupon (4%) and the current market yield (3·5% plus 50 basis points) are the same then the current market value is also its par value.

The yield on the new debt would be 5·1% plus 90 basis points to give 6%. If the new debt is issued at par at this yield of 6% then the market value of the existing debt will fall in line with the decrease in the company's credit rating and the consequential increase in yield to 4·4%:

$$MV_d = \frac{4}{1.044} + \frac{4}{1.044^2} + \frac{104}{1.044^3}$$

$$MV_d = \$98.90\%$$

Which when applied to the \$400 million par value gives a market value of \$395·90 million. On the assumption that the new debt is taken up at par then the new market value of debt in issue will rise to \$795·90 million.

The firm's effective cost of debt capital is calculated by weighting the yields of the two components of debt and then adjusting for tax:

$$r_d = \left[\frac{V_d^n}{V_d^n + V_d^o} r_d^n + \frac{V_d^o}{V_d^n + V_d^o} r_d^o \right] \times (1 - T)$$

$$r_d = \left[\frac{400}{400 + 395.90} \times 6\% + \frac{395.90}{400 + 395.90} \times 4.4\% \right] \times 0.7$$

$$r_d = 3.64\%$$

The firm's current cost of debt capital is 4% × (1 − 0·3) = 2·8% so the increase in gearing will raise the firm's cost of debt capital (after tax) by 84 basis points. However, this increase is in part due to the longer term to maturity on the new borrowing rather than the increase in the credit spread and the firm might wish to consider extending the term depending upon the yield curve and rates beyond four years.

(c) The advantages and disadvantages of this mode of capital financing.

Debt finance is a relatively low cost method of raising long term finance. Under static trade off theory we would expect higher gearing to generate improvements in the firm's cost of capital given the benefit of the tax shield. However, the cost of debt capital consists of three components: the pure risk free rate, the term premium and the credit spread. In this case we are proposing to alter our capital structure by taking on longer term debt and thus the advantages of higher gearing are to a certain extent obscured. Pecking order theory suggests that debt finance should be preferred to new equity finance and is normally taken by the market as a signal that management believe that the company is undervalued. In the context of an efficient market this is doubtful but it is certainly the case that there are strong agency effects through debt. Debt will exert a greater discipline over our action than equity finance and tends to suppress opportunistic investment and over consumption of perks.

From a transactions costs perspective, debt tends to be preferred for the acquisition of general assets with high marketability and equity for intangibles and highly specific assets. In the airline business finance of this level is normally for aeroplane acquisitions which do have a reasonably active second hand market.

The marking strategy for this paper is to construct a mark ramp such that the average student can attain a pass mark of 50% through the demonstration of a satisfactory level of knowledge and skills. Much of this ramp effect will be achieved through q1 and q2 but with each of the latter questions giving a substantial core of easily gained marks. Part A questions will carry a stated number of marks assigned to the professional quality of the answer. At this level, professional quality covers both presentational aspects and the ability to integrate both numerical and written material into a single coherent piece of work.

			Marks
1	**(a)**	For the correct calculation and presentation of the following:	
		Cash flow statement: operating cash flow	3
		Other items	3
		Total	6
	(b)	Calculation of the free cash flow before reinvestment	1
		Reinvestment deduction	2
		Working capital adjustment	2
		Summary of dividend capacity	1
		Total	6
	(c)	For the correct calculation of:	
		Calculation of the 2007 cost of equity using the CAPM	2
		Calculation of the WACC	3
		Calculation of the 2007/2008 EVA	4
		Report to management to include other metrics and commentary*	9
		Total	18

Professional marks awarded for the quality of the layout, clarity and persuasiveness of the presentation and integration of analytical data with the written text.

2	**(a)**	Calculation of the WACC	5
		Calculation of the value of both companies	6
		Deduction for option value	3
		Deduction for pension liability	2
		Total	16
	(b)	Identification, using market risk measures, of type three acquisition	1
		Comparison of FCF model with market capitalisation	2
		Note on the estimation error and likely causes	3
		Outline of iteration method for type three acquisition and the method of identifying a bid price	2
		The indeterminate outcome for market gearing following acquisition	2
		The likely impact upon the firm's WACC	2
		Report to management*	2
		Total	14

Professional marks awarded for the quality of the layout, clarity and persuasiveness of the presentation and integration of analytical data with the written text.

3 **(a)** Identification of inputs into BS model | 4

Calculation of d1 and d2 — 4

Calculation of real option value — 3

Conclusion on the value of the option to delay — 1

Total — 12

(b) Estimation of overall project value at $11·48 million — 2

Justification for the use of BS model — 2

Total — 4

(c) Outline of the limitations of the BS model — 2

Identification of the American style real option in the given circumstances — 1

Note on the appropriate technique for solving the American style option — 1

Total — 4

4 **(a)** Setting the scene and identification of core problem and its source — 2

Layout principal alternatives

Acquisition strategy — 2

Reorganisation, organic growth with cost minimisation — 2

Return cash to investors — 2

Incentives for management with share option scheme — 2

Total — 10

(b) Identification of core ethical issue — 2

Social policy and property rights arguments underpinning ethical dimension — 2

Resolution and advice — 4

Note on ethics of earnings management — 2

Total — 10

5 **(a)** Advice on the appropriate coupon rate — 4

Total — 4

(b) Estimate of current market value of debt — 2

Estimate of market value of debt following new issue — 3

Calculation of the revised cost of debt capital — 3

Total — 8

(c) Relative advantages and disadvantages

Asset specificity and matching — 2

Agency effects — 2

Static tradeoff arguments — 2

Pecking order — 2

Total — 8