Talam

1. The following **exhibits**, available on the left-hand side of the screen, provide information relevant to the question.

1. Talam Co

2. Uwa Project

3. Jigu Project as a real option

4. Biodegradable drones and related issues

This information should be used to answer the question **requirements** within your chosen **response option(s)**.

1	Talam Co

Talam Co, a listed company, aims to manufacture innovative engineering products which are environmentally friendly and sustainable. These products have been highly marketable because of their affordability. Talam Co's mission statement also states its desire to operate to the highest ethical standards. These commitments have meant that Talam Co has a very high reputation and a high share price compared to its competitors.

Talam Co is considering a new project, the Uwa Project, to manufacture drones for use in the agricultural industry, which are at least 50% biodegradable, at competitive prices. The drones will enable farmers to increase crop yields and reduce crop damage. Manufacture of drones is a new business area for Talam Co. The project is expected to last for four years.

Talam Co will also work on the Jigu Project (a follow-on project to the Uwa Project) to make 95%+ biodegradable drones. It is expected that the Jigu Project will last for a further five years after the Uwa Project has finished. If the Uwa Project is discontinued or sold sooner than four years, the Jigu Project could still be undertaken after four years.

2	Uwa Project

The following number of drones are expected to be produced and sold:

Year1234Number of drones sold4,30019,20035,60025,400

In the first year, for each drone, it is expected that the selling price will be $1,200 and the variable costs will be $480. The total annual direct fixed costs will be $2.7m. After the first year, the selling price is expected toincrease by 8% annually, the variable costs by 4% annually and the fixed costs by 10% annually, for the next three years. Training costs are expected to be 200% of the variable costs in year 1, 60% in year 2, and 10% in each of years 3 and 4. There is substantial uncertainty about the drones produced and sold, and Talam Co estimates the project to have a standard deviation of 30%.

At the start of every year, the Uwa Project will need working capital. In the first year, this will be 20% of sales revenue. In subsequent years, the project will require additional or a reduction in working capital of 10% for every $1 increase or decrease in sales revenue respectively. The working capital is expected to be fully recovered when the Uwa Project ceases.

The Uwa Project will need $35m of machinery to produce the drones at the start of the project. Tax allowable depreciation is available on the machinery at 15% per year on a straight-line basis. The machinery is expected to be sold for $7m (post-inflation) at the end of the project. Talam Co makes sufficient profits from its other activities to take advantage of any tax loss relief. Tax is paid in the year it falls due.

Honua Co's offer

Honua Co, whose main business is drone production, has approached Talam Co with an offer to buy the Uwa Project in its entirety from Talam Co, for $30m at the start of the third year of the project's life.Talam Co's finance director has requested that the value of Honua Co's offer is estimated using the real options method.

Additional information

Both Honua Co and Talam Co pay corporation tax at an annual rate of 20%. Talam Co has estimated Uwa Project's and Jigu Project's risk-adjusted cost of capital at 11%, based on Honua Co's asset beta. Talam Co believes that the central bank base rate, which is currently 2·30%, provides a good estimate of the risk-free rate of interest.

3	Jigu Project as a real option

Talam Co estimates that Jigu Project's cash flows are highly uncertain, and its standard deviation is 50%. It is estimated that $60m will be required at the start of the project in four years' time. Using conventional net present value, Talam Co's best estimate is that net present value of the project will be $10m at the start of the project.

The following figures were estimated for the Jigu Project using the real options method.

Asset value (P_a) = \$46.1m (to nearest 100,000)
Exercise price (P_e) = \$60m
Exercise date (t) = 4 years
Risk-free rate (r) = 2·30%
Volatility (s) = 50%

$d_1 = 0{\cdot}329$ $d_2 = -0{\cdot}671$ $N(d_1) = 0{\cdot}6288$ $N(d_2) = 0{\cdot}2510$

Call option value: \$15.3m

It can be assumed that the call option value is accurate.

Talam Co's finance director wants to know how the asset value of \$46.1m has been estimated.

4	Biodegradable drones and related issues

At a recent trade show, the biodegradable drones attracted considerable interest from organisations worldwide.

Nevertheless, some expressed concern about the drone price, which they felt was too high.

Talam Co estimates that even a modest reduction in each drone's price would make the projects unprofitable. Therefore, the operations director suggested that costs could be reduced if drone components were produced in Dunia, a country where Talam Co already gets some of its other products made.

However, the public relations director brought up an issue concerning Dunia. He said that several companies in Dunia, which Talam Co trades with, employ young teenage children. These companies pay the education fees for the teenagers and the companies argued that stopping this practice would harm the teenagers' families financially.

Requirements

(a) Discuss how incorporating real options into net present value decisions may help Talam Co with its investment appraisal decisions.

(5 marks)

(b) Prepare a report for the board of directors (BoD) of Talam Co which:

(i) Estimates, showing all relevant calculations, the net present value of the Uwa Project before considering the offer from Honua Co and the Jigu Project;

(12 marks)

(ii) Addresses the requests made by the finance director about the asset value for the Jigu project and estimated value of the offer from Honua Co using the real options method;

(7 marks)

(iii) Assesses whether the Uwa Project should be undertaken, using the results from, and discusses the assumptions made in, the calculations in (b)(i) and (b)(ii) above.

(8 marks)

(c) Discuss the impact on Talam Co and its aims arising from the possible sustainability and ethical issues relating to the biodegradable drones, and advise on how these issues may be addressed.

(8 marks)

Professional marks will be awarded for the demonstration of skill in communication, analysis and evaluation, scepticism and commercial acumen in your answer.

(10 marks)

Hav Co

2. The following **exhibits**, available on the left-hand side of the screen, provide information relevant to the question.

1. Hav Co

2. Strand Co - information about Strand Co an acquisition target

3. Financial information – relating to both companies and the suggested acquisition methods

This information should be used to answer the question **requirements** within your chosen **response option(s)**.

1	Hav Co

Hav Co is a publicly listed company involved in the production of highly technical and sophisticated electronic components for complex machinery. It has a number of diverse and popular products, an active research and development department, significant cash reserves and a highly talented management who are very good in getting products to market quickly.

A new industry that Hav Co is looking to venture into is biotechnology, which has been expanding rapidly and there are strong indications that this recent growth is set to continue. However, Hav Co has limited experience in this industry. Therefore it believes that the best and quickest way to expand would be through acquiring a company already operating in this industry sector.

2	Strand Co

Strand Co is a private company operating in the biotechnology industry and is owned by a consortium of business angels and company managers. The owner-managers are highly skilled scientists who have developed a number of technically complex products, but have found it difficult to commercialise them. They have also been increasingly constrained by the lack of funds to develop their innovative products further.

Discussions have taken place about the possibility of Strand Co being acquired by Hav Co. Strand Co's managers have indicated that the consortium of owners is happy for the negotiations to proceed. If Strand Co is acquired, it is expected that its managers would continue to run the Strand Co part of the larger combined company.

Strand Co is of the opinion that most of its value is in its intangible assets, comprising intellectual capital. Therefore, the premium payable on acquisition should be based on the present value to infinity of the after tax excess earnings the company has generated in the past three years, over the average return on capital employed of the biotechnological industry. However, Hav Co is of the opinion that the premium should be assessed on synergy benefits created by the acquisition and the changes in value, due to the changes in the price-to-earnings (PE) ratio before and after the acquisition.

3	Financial information

Given below are extracts of financial information for Hav Co for 20X3 and Strand Co for 20X1, 20X2 and 20X3:

	Hav Co	**Strand Co**		
Year ended 30 April	**20X3**	**20X3**	**20X2**	**20X1**
	$m	**$m**	**$m**	**$m**
Earnings before tax	1,980	397	370	352
Non-current assets	3,965	882	838	801
Current assets	968	210	208	198
Share capital ($0.25/share)	600	300	300	300
Reserves	2,479	183	166	159
Non-current liabilities	1,500	400	400	400
Current liabilities	354	209	180	140

The current average PE ratio of the biotechnology industry is 16.4 times and it has been estimated that Strand Co's PE ratio is 10% higher than this. However, it is thought that the PE ratio of the combined company would fall to 14.5 times after the acquisition. The annual after tax earnings will increase by $140m due to synergy benefits resulting from combining the two companies.

Both companies pay tax at 20% per year and Strand Co's annual cost of capital is estimated at 7%. Hav Co's current share price is $9.24 per share. The biotechnology industry's pre-tax return on capital employed is currently estimated to be 20% per year.

Hav Co has proposed to pay for the acquisition using one of the following methods:

(i) A cash offer of $5.72 for each Strand Co share; or

(ii) A cash offer of $1.25 for each Strand Co share plus one $100 3% convertible bond for every $5 nominal value of Strand Co shares. In six years, the bond can be converted into 12 Hav Co shares or redeemed at nominal value.

Requirements

(a) Distinguish between the different types of synergy and discuss possible sources of revenue synergy based on the above scenario.

(6 marks)

(b) Based on the two different opinions expressed by Hav Co and Strand Co, calculate the maximum acquisition premium payable in each case.

(7 marks)

(c) Calculate the percentage premium per share that Strand Co's shareholders will receive under each acquisition payment method and justify, with explanations, which payment method would be most acceptable to them.

(7 marks)

Professional marks will be awarded for the demonstration of skill in analysis and evaluation, scepticism and commercial acumen in your answer.

(5 marks)

Lurgshall

3. The following **exhibits**, available on the left-hand side of the screen, provide information relevant to the question.

1. Lurgshall Co

2. Hedging information

3. Chief executive's views

This information should be used to answer the question **requirements** within your chosen **response option(s)**.

1	Lurgshall Co

Lurgshall Co is a listed electronics company. Lurgshall Co has recently appointed a new chief executive, who has a number of plans to expand the company. The chief executive also plans to look carefully at the costs of all departments in Lurgshall Co's head office, including the centralised treasury department.

The first major investment which the chief executive will oversee is an investment in facilities to produce applications-specific components. To finance the planned investment, it is likely that Lurgshall Co will have to borrow money.

2	Hedging information

It is now 1 May. At present, it seems that Lurgshall Co will need to borrow $84 million on 1 September, for a period of six months, though both the amount and the period of borrowing are subject to some uncertainty. The treasurer plans to borrow the funds at a variable rate of central bank base rate plus 50 basis points. The central bank base rate is currently 4·5% but is expected to rise by up to 0·6% between now and 1 September.

So far, the possibility of hedging a rise in the base rate of 0·6% using a forward rate agreement or September $ futures has been investigated. The results of the calculations for these instruments were as follows:

4–10 Forward rate agreement from Birdam Bank: 5·38%

Three-month traded September $ futures: 5·36%

Lurgshall Co's treasurer also wants to consider using options on futures to hedge loans.

Although Lurgshall Co has not previously used swaps for hedging purposes, the treasurer has asked Birdam Bank to find a counterparty for a potential swap arrangement.

Relevant information about options and swaps is as follows:

Options

The current price for three-month $ September futures, $2 million contract size is 95·05. The price is quoted in basis points at 100 – annual % yield.

Options on three-month September $ futures, $2 million contract size, option premiums are in annual %

September calls	Strike price	September puts
0·132	95·25	0·411

It can be assumed that futures and options contracts are settled at the end of each month. Basis can be assumed to diminish to zero at contract maturity at a constant rate, based on monthly time intervals. It can also be assumed that there is no basis risk and there are no margin requirements.

Swap

Birdam Bank has found a possible counterparty to enter into a swap with Lurgshall Co. The counterparty can borrow at an annual floating rate of central bank base rate + 1·5% or a fixed rate of 6·1%. Birdam Bank has quoted Lurgshall Co a notional fixed rate of 5·6% for it to borrow. Birdam Bank would charge a fee of 10 basis points

to each party individually to act as the intermediary of the swap. Both parties would share equally the potential gains from the swap contract.

3	Chief executive's views

Lurgshall Co's new chief executive has made the following comments: 'I understand that the treasury department has a number of day-to-day responsibilities, including investing surplus funds for the short-term liquidity management and hedging against currency and interest rates. However, these tasks could all be carried out by the junior, less experienced, members of the department. I do not see why the department needs to employ experienced, expensive staff, as it does not contribute to the strategic success of the company.'

Requirements

(a) Compare the results of hedging the $84 million, using the options and the swap, with the results already obtained using the forward rate agreement and futures, and comment on the results. Show all relevant calculations, including how the interest rate swap would work.

(15 marks)

Note: Up to 4 marks are available for discussion.

(b) Criticise the views of the chief executive about the work carried out by the treasury department and the staff required to do this work.

(5 marks)

Professional marks will be awarded for the demonstration of skill in analysis and evaluation, scepticism and commercial acumen in your answer.

(5 marks)

Answers

Talam Co

Suggested Solution:

1. (a) When making decisions, following investment appraisals of projects, net present value assumes that a decision must be made immediately or not at all, and once made, it cannot be changed. Real options, on the other hand, recognise that many investment appraisal decisions have some flexibility.

For example, decisions may not have to be made immediately and can be delayed to assess the impact of any uncertainties or risks attached to the projects. Alternatively, once a decision on a project has been made, to change it, if circumstances surrounding the project change. Finally, to recognise the potential future opportunities, if the initial project is undertaken, like the Jigu Project.

Real options give managers choices when making decisions about whether or not to undertake projects, by estimating the value of this flexibility or choice. Real options take into account the time available before a decision, on a project, has to be made, and the risks and uncertainties attached to the project. It uses these factors to estimate an additional value which can be attributable to the project. Real options view risks and uncertainties as opportunities, where upside outcomes can be exploited, and a company has the option to disregard any downside impact.

By incorporating the value of any real options available into an investment appraisal decision, Talam Co will be able to assess the full value of a project.

(b) Report to the board of directors (BoD), Talam Co

Introduction

This report assesses whether or not the Uwa Project should be undertaken based on its value from an initial net present value (NPV) calculation, and then taking into account the options provided by the offer from Honua Co and the Jigu Project. As part of the assessment, a discussion of the assumptions and their impact on the assessment is provided.

Assessment

The value of the Uwa Project based on just the initial NPV is a small negative amount of $(6,000) approximately (appendix 1). This would indicate that the project is not worth pursuing, although the result is very marginal. The offer from Honua Co, and the Jigu Project, using the real options method, gives an estimated value of $17.71m (appendix 2), which is positive and substantial. This indicates that the Uwa Project should be undertaken.

Assumptions

The following assumptions have been made when calculating the values in appendices 1 and 2.

– Since the Uwa Project is in a different industry to Talam Co's current activities, the project-specific, risk-adjusted cost of capital of 11% based on Honua Co's asset beta is used. It is assumed that Honua Co's asset beta would provide a good approximation of the business risk inherent in drone production.

– It is assumed that all the variables used to calculate the values of the projects in appendices 1 and 2 are correct and accurate. Furthermore, it is assumed all the variables such as inflation rates, tax rates, interest rates and volatility figures, remain as forecast through the period of each project. It is also assumed that the time periods related to the projects and the offer from Honua is accurate and/or reasonable.

– The Black-Scholes option pricing (BSOP) model is used to estimate the real option values of the Jigu Project and the Honua Co offer. The BSOP model was developed for financial products and not for physical products, on which real options are applied. The BSOP model assumes that a market exists to trade the underlying project or asset without restrictions, within frictionless financial and product markets.

– The BSOP model assumes that the volatility or risk of the underlying asset can be determined accurately and readily. Whereas for traded financial assets this would most probably be reasonable, as there is likely to be sufficient historical data available to assess the underlying asset's volatility, this is probably not going to be the case for real options. For large, one-off projects, there would be little or no historical data available. Volatility in such situations would need to be estimated using simulation models, such as the Monte-Carlo simulation, with the need to ensure that the model is developed accurately and the data input used to generate outcomes reasonably reflects what is likely to happen in practice.

– The BSOP model assumes that the real option is a European-style option which can only be exercised on the date when the option expires. In some cases, it may make more strategic sense to exercise an option earlier. The real option is more representative of an American-style option which can be exercised before expiry. Therefore, the BSOP model may underestimate the true value of an option.

– Real options models assume that any contractual obligations involving future commitments made between parties will be binding, and will be fulfilled. For example, it is assumed that Honua Co will fulfil its commitment to purchase the project from Talam Co at the start of the third year for $30 million and there is therefore no risk of non-fulfilment of that commitment.

– The BSOP model does not take account of behavioural anomalies which may be displayed by managers when making decisions.

Conclusion

The initial recommendation is that the Uwa Project should be undertaken when the offer from Honua Co and going ahead with the Jigu Project are included. Taken together, these result in a significant positive NPV. However, one or more of the above assumptions may not apply and therefore NPV value is not a 'correct' value. Instead, the appendices provide indicative value which can be attached to the flexibility of a choice of possible future actions which are embedded with the Uwa Project and indicate that it should be undertaken.

Report compiled by:

Date

(Note: Credit will be given for alternative and valid discussion comments)

APPENDICES:

Appendix 1 (Part (b) (i)):

Net present value computation of the Uwa Project before incorporating the offer from Honua Co and the financial impact of the Jigu Project. All figures are in $000s.

Year	**0**	**1**	**2**	**3**	**4**
Sales revenue (w1)		5,160	24,883	49,840	38,405
Less:					
Variable costs (w2)		2,064	9,581	18,476	13,716
Fixed costs		2,700	2,970	3,267	3,594
Training costs		4,128	5,749	1,848	1,372
Cash flows before tax		(3,732)	6,583	26,249	19,723
Tax (w3)		1,796	(267)	(4,200)	(1,495)
Working capital	(1,032)	(1,972)	(2,496)	1,144	4,356
Machinery purchase and sale	(35,000)				7,000
Net cash flows	(36,032)	(3,908)	3,820	23,193	29,584
Present value of cash flows (discounted at 11%)	(36,032)	(3,521)	3,100	16,959	19,488

Approximate net present value of the project = $(6,000)

Workings:

Working 1 (w1): Sales revenue

Year	**1**	**2**	**3**	**4**
Units produced and sold	4,300	19,200	35,600	25,400
Selling price ($) (inflated at 8%)	1,200	1,296	1,400	1,512

Sales revenue ($000)	5160	24,883	49,840	38,405

Working 2 (w2): Variable costs

Year	**1**	**2**	**3**	**4**
Units produced and sold	4,300	19,200	35,600	25,400
Variable costs per unit ($) (inflated at 4%)	480	499	519	540
Total variable costs ($000)	2,064	9,581	18,476	13,716

Working 3 (w3): Tax

Year	**1**	**2**	**3**	**4**
Cash flows before tax	(3,732)	6,583	26,249	19,723
Tax allowable depreciation	(5,250)	(5,250)	(5,250)	(12,250)
Taxable cash flows	(8,982)	1,333	20,999	7,473
Tax payable 20%	(1,796)	267	4,200	1,495

Appendix 2 (Part (b) (ii)):

Jigu Project: Asset value

Asset value of Jigu Project of $46.1m is estimated as present value of future cash flows related to the project:

$70m x $1{\cdot}11^{-4}$, where $70m = $60m + $10m.

Honua Co offer, initial variables used to calculate the d_1, d_2, $N(d_1)$ and $N(d_2)$ figures:

Asset value (P_a) = $16,959,000 + $19,488,000 = $36,447,000 (cash flows foregone)

Exercise price (P_e) = $30m

Exercise date (t) = 2 years

Risk-free rate (r) = 2·30%

Volatility (s) = 30%

	A	B	C	D	E
1					
2	**Pa**	**Pe**	**r**	**t**	**s**
3	36.447	30.000	0.023	2	0.30
4					
5	**d1**	0.7794			
6	**d2**	0.3551			
7	**Nd1**	0.7821			
8	**Nd2**	0.6387			
9	**c**	10.21			
10	**p**	2.41			
11					

Value of put = $2.41m

Estimated total value arising from the two real options

Value of Jigu Project: $15.3m

Value of Honua Co's offer: $2.41m

Estimated total value from the two real options: $2.41m + $15.3m = $17.71m

(c) The overarching issue is that of conflict between the need to satisfy shareholders and the financial markets, and Talam Co's stated aims of bringing affordable environmentally friendly products to market and maintaining high ethical standards. This overarching issue can be broken down into smaller related issues.

Producing profitable products will presumably result in positive NPV projects, thus ensuring a continued strong share price performance. This should satisfy the markets and shareholders. However, if the products cannot be sold at a reasonable selling price because some farmers are not able to afford the higher prices, then this may compromise Talam Co's aim of bringing environmentally friendly products to market and making them affordable.

A possible solution is to lower production costs, by shifting manufacturing to locations where such costs are lower. Talam Co's BoD thus considered the move to Dunia, to lower production costs. This presumably would allow Talam Co to reduce prices and make the drones more affordable, but at the same time ensure that the projects result in positive NPVs. However, the issue here is that supplier companies in Dunia whom Talam Co trades with use young teenage children as part of their workforce. This may impact negatively on Talam Co's stated aim of maintaining high ethical standards. In fact, Talam Co may need to rethink its links with companies it trades with in Dunia entirely. Otherwise there is a real risk that Talam Co could suffer from long-term loss of reputation, and this may cause substantial and sustained financial damage to the company.

Talam Co may decide that maintaining its share price and its reputation should take the highest priority and therefore it may reach a decision that the best way to address the issue(s) is to not try to reduce costs, and to withdraw from Dunia completely. But this would prevent many agriculturalists from taking advantage of the biodegradable drones. Therefore, Talam Co may want to explore alternative ways to meet all the aims.

Talam Co could consider moving to another location, if this was feasible. It is not known from the narrative whether or not viable alternatives are available, but Talam Co would need to ensure that possible alternative locations would have the infrastructure to produce the components at the same or lower costs. Talam Co may also want to consider the softer issues; for example, it will want a good working relationship and network in the new locations which it has with the companies in Dunia. These may need to be developed and would take time and probably incur additional costs.

For these reasons, Talam Co may decide to explore the existing production facilities in Dunia further. It is possible that the supplier companies are not exploiting the young teenage children, but are supporting their education and their families in a positive way. Stopping the relationship may jeopardise this support. Talam Co would need to investigate the working conditions of the children and the manner in which they are rewarded and supported. It may want to consult the guardians of the young teenage children and see if there are other feasible solutions. For example, could the guardians be employed instead of the young teenage children or are they already engaged in alternative employment?

After all factors are considered, Talam Co may conclude that the best way to achieve all its aims is to continue in Dunia and also have the production of drone components located there. If this is the case and young teenage children continue to be employed there, then Talam Co would need a sustained public relations campaign to defend its position and demonstrate how it ensures that the teenage children have not been exploited, but are gainfully employed and receiving a good education to help them progress in life.

(Note: Credit will be given for alternative and valid discussion comments)

Marking Guide:

(a)	1–2 marks per well-discussed comment	**Max 5**
(b)(i)	(Appendix 1)	
	Sales revenue	2
	Variable costs	2
	Fixed costs	1
	Training costs	2

	Tax	2
	Working capital	2
	Uwa Project net present value	1
		12
(b)(ii)	(Appendix 2)	
	Jigu Project: underlying asset value	2
	Honua Co offer: exercise price	1
	Honua Co offer: underlying asset value	2
	Honua Co offer: other variables used in option calculation	1
	Honua Co offer – choose put value	1
		7
(b)(iii)	Initial assessment of value of Uwa Project	2 - 3
	Up to 2 marks per well-discussed assumption	
	(Max 3 marks if assumptions related to real options are not discussed)	6
		Max 8
(c)	Discussion of the issues	4 – 5
	Discussion of how the issues may be addressed	4 – 5
		Max 8
	Professional skills marks	**10**
		50

Professional skills

Communication

- General report format and structure (use of headings/sub-headings and an introduction)
- Style, language and clarity (appropriate layout and tone of report response, presentation of calculations, appropriate use of the tools)
- Effectiveness of communication (answer is relevant, specific rather than general and focused to the requirement)

Analysis and Evaluation

- Appropriate use of the data to determine suitable calculations
- Appropriate use of the data to support discussion and draw appropriate conclusions
- Identification of further analysis, which could be carried out to enable an appropriate recommendation to be made.
- Demonstration of ability to consider relevant factors applicable to Talam Co's choices

Scepticism

- Effective challenge of information and assumptions supplied and, techniques carried out to support any investment decision

Commercial acumen

- Effective use of examples and/or calculations from the scenario information and other practical considerations related to the context to illustrate points being made in respect of options and sutainability/ethics
- Recognition of external constraints and opportunities as necessary

Hav Co

2.

(a)

An acquisition creates synergy benefits when the value of the combined entity is more than the sum of the two companies' values. Synergies can be separated into three types: revenue synergies which result in higher revenues for the combined entity, higher return on equity and a longer period when the company is able to maintain competitive advantage; cost synergies which result mainly from reducing duplication of functions and related costs, and from taking advantage of economies of scale; financial synergies which result from financing aspects such as the transfer of funds between group companies to where it can be utilised best, or from increasing debt capacity.

Revenue synergies are perhaps where the greatest potential for growth comes from but are also more difficult to identify, quantify and enact. Good post-acquisition planning is essential for these synergies to be realised but they can be substantial and long-lasting. In this case, Hav Co's management can help market Strand Co's products more effectively by using their sales and marketing talents resulting in higher revenues and longer competitive advantage. Research and development activity can be combined to create new products using the technologies in place in both companies, and possibly bringing innovative products to market quicker. The services of the scientists from Strand Co will be retained to drive innovation forward, but these need to be nurtured with care since they had complete autonomy when they were the owners of Strand Co.

The main challenge in ensuring long-lasting benefits is not only ensuring accurate identification of potential synergies but putting into place integration processes and systems to gain full benefit from them. This is probably the greater challenge for management, and, when poorly done, can result in failure to realise the full value of the acquisition. Hav Co needs to be aware of this and make adequate provisions for it.

(Note: Credit will be given for alternative relevant comments and suggestions)

(b)

Maximum premium based on excess earnings method

Average pre-tax earnings: (397 + 370 + 352)/3 = $373.0m

Average capital employed: [(882 + 210 –209) + (838 + 208 –180) + (801 + 198 – 140)]/3 = $869.3m

Excess annual value/annual premium = 373m –(20% x $869.3m) = $199.1m

After-tax annual premium = $199.1m x 0.8 = $159.3m

PV of annual premium (assume perpetuity) = $159.3m/0.07 = $2,275.7m

According to this method, the maximum premium payable is $2,275.7m in total.

Maximum premium based on price-to-earnings (PE) ratio method

Strand Co estimated PE ratio = 16.4 x 1.10 = 18.0

Strand Co profit after tax: $397m x 0.8 = $317.6m

Hav Co profit after tax = $1,980m x 0.8 =$1,584.0m

Hav Co, current value = $9.24 x 2,400 shares = $22,176.0m

Strand Co, current value = $317.6m x 18.0 = $5,716.8m

Combined company value = ($1,584m + $317.6m + $140.0m) x 14.5 = $29,603.2m

Maximum premium = $29,603.2m –($22,176.0m + $5,716.8) = $1,710.4m

(c)

Strand Co, current value per share = $5,716.8m/1,200m shares = $4.76 per share

Maximum premium % based on PE ratio = $1,710.4m/$5,716.8m x 100% = 29.9%

Maximum premium % based on excess earnings = $2,275.7m/$5,716.8m x 100% = 39.8%

Cash offer: premium (%)

($5.72 –$4.76)/$4.76 x 100% = 20.2%

Cash and bond offer: premium (%)

Each share has a nominal value of $0.25, therefore $5 is $5/$0.25 = 20 shares

Bond value = $100/20 shares = $5 per share

Cash payment = $1.25 per share

Total = $6.25 per share

Premium percentage = ($6.25 –$4.76)/$4.76 = 31.3%

On the basis of the calculations, the cash together with bond offer yields the highest return; in addition to the value calculated above, the bonds can be converted to 12 Hav Co shares, giving them a price per share of $8·33 ($100/12). This price is below Hav Co's current share price of $9·24, and therefore the conversion option is already in-the-money. It is probable that the share price will increase in the 10-year period and therefore the value of the convertible bond should increase. A bond also earns a small coupon interest of $3 per $100 a year. The 31·3% return is the closest to the maximum premium based on the excess earnings method and more than the maximum premium based on the PE ratio method. It would seem that this payment option transfers more value to the owners of Strand Co than the value created based on the PE ratio method.

However, with this option Strand Co shareholders only receive an initial cash payment of $1·25 per share compared to $5·72 per share for the cash payment method. This may make it the more attractive option for the Hav Co shareholders as well, and although their shareholding will be diluted under this option, it will not happen for some time.

The pure cash offer gives an immediate and definite return to Strand Co's shareholders, but is also the lowest offer and may also put a significant burden on Hav Co having to fund so much cash, possibly through increased debt.

It is likely that Strand Co's shareholder/managers, who will continue to work within Hav Co, will accept the mixed cash and bond offer. They, therefore, get to maximise their current return and also potentially gain when the bonds are converted into shares. Different impacts on shareholders' personal taxation situations due to the different payment methods might also influence the choice of method.

It should also be noted that the maximum premiums calculated have used what appears to be subjective adjustments to a PE ratio, or the assumption that annual excess earnings will occur in perpetuity. Neither of these may hold in reality, which would affect the maximum premium payable.

Marking Guide:

(a)	Distinguish between the different synergies	2
	Discuss possible revenue synergy sources	3
	Concluding comments	1
		6
(b)	Average earnings and capital employed	1

	Average capital employed	1
	After-tax annual premium	1
	PV of premium (excess earnings method)	1
	Hav Co and Strand Co values	1
	Combined company value	1
	Value created/premium (PE method)	1
		7
(c)	Strand Co, value per share	1
	Cash offer premium (%)	1
	Cash and bond offer premium (%)	2
	Explanation and justification	3
		7
	Professional skills	**5**
		25

Professional skills

Analysis and Evaluation

- Appropriate use of the data to determine suitable calculations
- Appropriate use of the data to support discussion and draw appropriate conclusions
- Appraisal of information objectively to make a recommendation on preferred payment method

Scepticism

- Effective challenge and critical assessment of the information and assumptions provided relation to the valuations

Commercial acumen

- Effective use of examples and/or practical considerations related to the context to illustrate points being made relating to synergies or payment methods

Lurgshall

3.

(a)

Options

Buy put options as need to hedge against a rise in interest rates.

Number of contracts required: $84,000,000/$2,000,000 x 6/3 = 84

Total basis = current price (1 May) – futures price = (100 – 4·50) – 95·05 = 0·45

Unexpired basis on 1 September = 0·45 x 1/5 = 0·09

Expected futures price = 100 – 5·1 – 0·09 = 94·81

Exercise price	95·25
Futures price as above	94·81
Exercise?	Yes
Gain in basis points	44

	$
Interest paid ($84,000,000 x 5·6% x 6/12)	2,352,000
Gain from options 0·0044 x $2,000,000 x 3/12 x 84	(184,800)
Premium 0·00411 x $2,000,000 x 3/12 x 84	172,620
Net payment	2,339,820
Effective annual interest rate 2,339,820/84,000,000 x 12/6	5·57%

Swaps

	Lurgshall Co	**Counterparty**	**Interest rate differential**
Fixed rate	5.60%	6.10%	0.50%
Floating rate	Base rate + 0.50%	Base rate + 1.50%	1.00%

Lurgshall Co has an advantage in borrowing at both fixed and floating rates, but the floating rate advantage is larger.

Gain % for Lurgshall Co = 50% (1 – 0·5 – 0·2) = 0·15

	Lurgshall Co	**Counterparty**
Rate without swap	(5.60%)	(Base rate + 1.50%)
Benefit	0.15%	0.15%
Net result	(5.45%)	(Base rate + 1.35%)
Swap		
Borrows at	(Base rate + 0.50%)	(6.10%)
Lurgshall Co pays	(4.85%)	4.85%
Counterparty pays	Base rate	(Base rate)
Bank fee	(0.10%)	(0.10%)
Net result	(5.45%)	(Base rate + 1.35%)

Comments

The swap gives a result which is marginally worse than the forward rate agreement and the futures. The options give a worse result than the other choices.

Risks which might be considered include counterparty risk for the forward rate agreement and swap. Using Birdam Bank should mean that this risk is low for forward rate agreements, and also for swaps, assuming that the bank bears the risk of the counterparty defaulting.

Basis risk should be considered for the traded futures. Here, because the differences between the instruments are small, a failure to estimate basis accurately may mean that futures are chosen when they do not offer the lowest borrowing cost. For the swaps, if Lurgshall Co swaps into fixed rate debt, it faces the market risk of an unexpected fall in interest rates.

Other factors to consider include the possibility that rates will increase rather less than forecast, meaning that the option would not be exercised and at some point would be the lowest cost choice. The length of time of the swap also needs to be considered. Although it commits Lurgshall Co to the fixed rate, if the borrowing turns out to be longer than the six months, the swap may provide a better time match than the other hedging opportunities.

(b)

The chief executive appears to underestimate the degree of knowledge required for day-to-day work. Less experienced staff may be able to arrange borrowing if the lender has already been chosen or, for example, arrange forward rate agreements to be used if they are prescribed.

However, if judgement is required as to, for example, which lender or hedging instrument to use, using less experienced staff may mean that a sub-optimal decision is taken. Poor decisions may result in opportunity costs, for example, not using the

lender who gives the best deal or being committed to a fixed forward rate agreement when an option would have allowed the business to take advantage of favourable rate movements. These opportunity costs may not be as clear as the salary costs of experienced staff.

As the business operates internationally, the treasury department will need to monitor financial market conditions and exchange rates, and other issues which may be significant such as political developments. Because of their previous experiences, longer-serving staff are more likely to appreciate the implications of developments and whether treasury policies and decisions need to change in response to changes in risk. Senior staff are also needed to manage the work of less experienced staff to prevent or mitigate the effect of mistakes which may be costly.

Experienced staff are also needed to establish overall guidelines and policies for treasury activities. Their judgement will be required to establish principles which will mean that actions taken by staff are in line with the risk appetite of the business and are sufficiently prudent from the viewpoint of risk management. Experienced staff will also have greater knowledge of law, accounting standards and tax regulations, which can help the business avoid penalties and perhaps structure its dealings so that it can, for example, minimise the level of tax paid.

The chief executive has plans for a major expansion of the business, involving significant investment and financing decisions. Advice from experienced treasury staff will be invaluable in supporting the decisions required. If Lurgshall Co is planning a major acquisition, the treasury function can provide advice on the structure of consideration and financing implications. If, as here, a major investment is being contemplated, experienced staff can advise on translating views on risk into a relevant cost of capital, which will help ensure that the financial appraisal of the investment is realistic.

Marking Guide:

(a)	**Options**	
	Buy put options	1
	Number of contracts	1
	Basis calculation	1
	Premium calculation	1
	Exercise option?	1
	Final outcome	1
	Swaps	
	Comparative advantage and recognition of benefit	2
	Initial decision to borrow floating by Lurgshall Co and fixed by counterparty	1
	Swap impact	2
	Net benefit after bank charges	1

	Comments	3-4
		15
(b)	1–2 marks per relevant point	**Max 5**
	Professional skills marks	**5**
		25

Professional skills

Analysis and Evaluation

- Appropriate use of the data to determine suitable calculations
- Appropriate use of the data to support discussion and draw appropriate conclusions
- Appraisal of information objectively to make a hedging recommendation

Scepticism

- Effective challenge of evidence and assumptions supplied with respect to the chief executive's view on the treasury department

Commercial acumen

- Effective use of examples and/or practical considerations related to the context to illustrate points being made relating to hedging the transaction or treasury discussion