

**MARK PLAN AND EXAMINER'S COMMENTARY**

The marking plan set out below was that used to mark this question. Markers were encouraged to use discretion and to award partial marks where a point was either not explained fully or made by implication. More marks were available than could be awarded for each requirement. This allowed credit to be given for a variety of valid points which were made by candidates.

**Question 1****Total Marks:**

<b>General comments</b>					
This was a four-part question, which tested the candidates' understanding of the investment decisions element of the syllabus. The scenario was that a UK company was considering launching a new product on the market and also planning additional investment into other projects.					
<b>(a)</b>					
	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	<b>£m</b>	<b>£m</b>	<b>£m</b>	<b>£m</b>	<b>£m</b>
Contribution		34.56	41.73	39.44	37.27
Fixed costs		(4.00)	(4.12)	(4.24)	(4.37)
Annual Rent	(1.50)	(1.50)	(1.50)	(1.50)	
Operating cash flows	(1.50)	29.06	36.11	33.70	32.90
Tax 21%	0.32	(6.10)	(7.58)	(7.08)	(6.91)
Machinery and equipment	(60.00)				5.00
Tax saved on Ca's	2.27	1.86	1.52	1.25	4.65
Working Capital	(2.00)	(0.42)	0.13	0.13	2.16
Net cash flows	(60.91)	24.40	30.18	28.00	37.80
PV factors at 10%	1.00	0.909	0.826	0.751	0.683
Present value	(60.91)	22.18	24.93	21.02	25.82
NPV		33.04			
A positive NPV therefore Alliance should accept the project.					
The contribution per unit = £800 x 0.40 = £320.					
The annual sales in units in year one = 9,000 x 12 = 108,000 units.					
The total contribution per year =					
Year 1: 108,000 x £320 = £34.56 m					
Year 2: £34.56m x 1.15 x 1.05 = £41.73 m					
Year 3: £41.73m x 0.90 x 1.05 = £39.44 m					
Year 4: £39.44m x 0.90 x 1.05 = £27.27 m					
Working capital:					
Year 1: 2.00 x 1.15 x 1.05 = £2.42 m. Increment 2.00 – 2.42 = £(0.42) m					
Year 2: 2.42 x 0.90 x 1.05 = £2.29 m. Increment 2.42 – 2.29 = £0.13 m					
Year 3: 2.29 x 0.90 x 1.05 = £2.16 m. Increment 2.29 – 2.16 = £0.13 m					
Year 4: Release of working capital £2.16 m.					
Capital allowances and the tax saved:					
	<b>Cost/WDV</b>	<b>CA</b>	<b>Tax</b>		
0	60.00	10.80	2.27		
1	49.20	8.86	1.86		
2	40.34	7.26	1.52		
3	33.08	5.95	1.25		

4	27.13			
sale	-5.00	22.13	4.65	
Nominal cost of capital: $(1.07 \times 1.03)^{-1} = 0.1021$ . 10.21% or 10%				
Well answered by many candidates, however common errors that weaker candidates made were failing to calculate annual demand from monthly data, inflating cash flows which had already been inflated because of price increases, deducting contribution from sales, treating WDAs as outflows not inflows, failing to put rent in advance and using real discount rate for money flows. All easy things, where errors should have been avoided. The hardest part was WC flows (as expected).				
Total possible marks				16
Maximum full marks				16

<b>(b)</b>				
Contribution X (1-0.21)	27.30	32.97	31.15	29.44
PV factors at 10%	0.909	0.826	0.751	0.683
Present Value	24.81	27.23	23.39	20.10
Total present value	95.53			
Sensitivity: $\text{£}33.04\text{m}/\text{£}95.53\text{m} = 35\%$				
A 35% fall in sales would result in a zero NPV.				
Alliance should consider its estimates of future sales and decide whether it is likely that there will be a 35% drop in sales. This is especially pertinent when there are similar products on the market and Alliance's market share may be eroded more than predicted.				
Not well answered by the majority of candidates, with weaker candidates used sales instead of contribution.				
Total possible marks				5
Maximum full marks				4

<b>(c)</b>	
The disadvantages of sensitivity analysis are:	
<ul style="list-style-type: none"> <li>• It assumes that changes to variables can be made independently.</li> <li>• It ignores probability. It only identifies how far a variable needs to change to result in a zero NPV; it does not look at the probability of such a change.</li> <li>• It is not an optimising technique and does not point directly to a correct decision.</li> </ul>	
Simulation goes some way to address the weaknesses of sensitivity analysis. The main advantage is that it allows the effect of more than one variable changing at the same time to be assessed. This gives more information about the possible outcomes and their relative probabilities and it is useful for problems that cannot be solved analytically. However it should be noted that simulation is also not an optimising technique and does not point directly to a correct decision.	
Responses to this part of the question were mixed and often lacked detail or included irrelevant material (e.g. advantages of sensitivity).	
Total possible marks	6
Maximum full marks	6

<b>(d) (i)</b>	
<p>There are two types of capital rationing:</p> <p>Hard rationing is where the external capital markets limit the supply of funds                  Soft rationing is where internally the firm imposes its own constraints on the amount of funds to be raised and invested in projects. This investment limit may be used as a surrogate for other constraints, eg insufficient managerial capacity to handle all positive NPV projects.                  Soft rationing may also arise where it is impractical for the firm to go the market and raise a small amount of finance.</p> <p>Alliance’s chairman has stated that “We will continue to see excellent opportunities to invest in profitable projects across our business and we have no difficulty in raising finance. However we will be disciplined in our approach to committing to capital expenditure”. However the board of Alliance has chosen to limit the capital expenditure budget (excluding Autowater) to £350 million. It is therefore apparent that Alliance is employing soft capital rationing.</p>	
Well answered by many students however weaker candidates thought that that hard v soft capital rationing meant the difference between indivisible and divisible projects.	
Total possible marks	5
Maximum full marks	5

<b>(d) (ii)</b>																
<p>The possible combinations are:</p> <p>The £350 million will be allocated to the combination of projects that yields the highest NPV by trial and error since they are indivisible.</p> <p>The possible combinations are:</p> <table border="1"> <thead> <tr> <th><b>Projects</b></th> <th><b>Initial expenditure £ m</b></th> <th><b>NPV £ m</b></th> </tr> </thead> <tbody> <tr> <td>A, B, C, D</td> <td>330</td> <td>520</td> </tr> <tr> <td>A, B, C, E</td> <td>290</td> <td>510</td> </tr> <tr> <td>B, C, D, E</td> <td>330</td> <td>480</td> </tr> <tr> <td>A, D, E</td> <td>340</td> <td>470</td> </tr> </tbody> </table> <p>The combination of projects that maximises shareholder wealth is A, B C, D.</p>		<b>Projects</b>	<b>Initial expenditure £ m</b>	<b>NPV £ m</b>	A, B, C, D	330	520	A, B, C, E	290	510	B, C, D, E	330	480	A, D, E	340	470
<b>Projects</b>	<b>Initial expenditure £ m</b>	<b>NPV £ m</b>														
A, B, C, D	330	520														
A, B, C, E	290	510														
B, C, D, E	330	480														
A, D, E	340	470														
Very mixed and unclear answers with many candidates using NPV/£invested which applies to divisible rather than indivisible projects. The question clearly stated that the projects were indivisible.																
Total possible marks	4															
Maximum full marks	4															

**Question 2****Total Marks:**

<b>General comments</b>					
This was a five-part question that tested the candidates' understanding of the financing options element of the syllabus. The scenario of the question was that a company was considering diversifying into a different industry sector. The diversification would have been in non-domestic countries, some of which would be in developing countries.					
<b>(a) (i)</b>					
The current WACC using CAPM.					
$K_e = 2 + 1.1 \times (7 - 2) = 7.5\%$					
Kd =					
The ex-interest debenture price is £94 (99-5).					
<b>Timing - years</b>	<b>Cash Flow £</b>	<b>Factors at 5%</b>	<b>PV £</b>	<b>Factors at 10%</b>	<b>PV £</b>
0	(94)	1	(94)	1	(94)
1-4	5	3.546	17.73	3.170	15.85
4	100	0.823	82.30	0.683	68.30
			6.03		(9.85)
IRR = $5 + (6.03/(6.03+9.85)) \times 5 = 6.90\%$					
Kd = $6.90 \times (1-0.21) = 5.45\%$					
The ex div share price is 360p – 10p = 350p.					
The market value of equity is: $350p \times (365m/0.20) = £6,387.50m$					
The market value of debt is: $£ 2,200 m \times (94/100) = £2068 m$					
The debt equity ratio is: 0.24:0.76.					
The current WACC is: $7.5 \times 0.76 + 5.45 \times 0.24 = 7\%$					
Many basic errors, which really shouldn't be occurring given how many times, this has been set. The errors include inability to number crunch correctly, incorrect use of the CAPM equation, incorrectly calculating the number of shares in issue, not calculating the ex-div share price and/or the ex-interest debenture price, for the cost of debt calculating +ve and –ve values and interpolating outside the range calculated, no tax adjustment for the cost of debt.					
Total possible marks	8				
Maximum full marks	8				

<b>(a) (ii)</b>
The current WACC using the Gordon growth model.
The growth rate is calculated using r x b:
Earnings per share = Share (ex div) x earnings yield = $350p \times 0.07 = 24.5p$ .
The proportion of profits retained (b) = $(24.5 - 10)/24.5 = 59\%$
Total earnings = EPS x the number of shares in issue = $24.5p \times 1825 = £447 m$ (The number of shares in issue = $365/0.20 = 1825$ )
The accounting rate of return (r) = $£447m / [£5,153 - (1825 \times £0.145)] m = 9.1\%$
The growth rate is: $0.091 \times 0.59 = 0.054$ or 5%

Using the Gordon growth model $K_e = ((10 \times 1.05)/350) + 0.05 = 0.08$ or 8%	
WACC = $8 \times 0.76 + 5.45 \times 0.24 = 7.39\%$	
Again many basic errors despite very similar questions in the revision QB. Many had no idea at all. However there were some good answers but even those forgot to correctly calculate the retained profits. Many students calculated unrealistic growth figures and blindly used them with no reality check.	
Total possible marks	6
Maximum full marks	6

<b>(b)</b>	
<p>The gearing of BBB will be unchanged after the diversification and it is therefore appropriate to apply the existing gearing ratio of debt:equity 0.24:0.76 in the calculation of the WACC to be used to appraise the Climhigh project. However the cost of equity to be included in the WACC calculation should reflect the systematic risk of the climbing wall industry. This can be achieved by using an appropriate equity beta in the CAPM. An equity beta for a company operating in the climbing wall industry is 1.90, however the company has a different gearing ratio to BBB and gearing adjustments will have to be made.</p> <p>Degearing the equity beta: <math>B_a = 1.90 \times (6/(6 + 4(1-0.21))) = 1.24</math></p> <p>Regearing using BBB's gearing ratio <math>B_e = 1.24 \times ((0.76 + 0.24(1-0.21))/0.76) = 1.55</math></p> <p><math>K_e = 2 + 1.55(7 - 2) = 9.75\%</math></p> <p>The appropriate WACC to appraise the project is:</p> <p><math>9.75 \times 0.76 + 5.45 \times 0.24 = 8.7\%</math></p>	
Was often confused with part (c). No reality checks again with some students clearly demonstrating that they have a very shallow knowledge of the topic, errors include calculating unrealistic equity betas, e.g. Beta = 20.485, degearing using MV and regearing with BV despite the formulae sheet clearly stating MV should be used, degearing and regearing with same debt/equity ratio and ending up with a different figure from the original. Very brief explanations.	
Total possible marks	6
Maximum full marks	6

<b>(c)</b>	
<p>The overall equity beta of BBB if it undertakes the Climhigh project will be:</p> <p><math>1.10 \times 0.80 + 1.55 \times 0.20 = 1.19</math></p> <p>The overall <math>K_e</math> will be: <math>2 + 1.19 \times (7 - 2) = 7.95\%</math></p> <p>The overall WACC will be: <math>7.95 \times 0.76 + 5.45 \times 0.24 = 7.35\%</math></p> <p>The overall WACC excluding the Climhigh project was 7% and with the project it is 7.35%. This is not a material increase in the company's WACC and, considering the discount rate alone, there should not be any material reduction in company's value. However the actual affect will depend on the markets view of the diversification.</p>	
Despite this being set before and a detailed example in the study manual very poor attempts by most candidates. Candidates' explanations of the relationship between the value of the company and the discount rate were very poor.	
Total possible marks	6
Maximum full marks	6

<b>(d)</b>	
<p>BBB is considering investing in other countries some of which are developing countries. BBB could potentially face the political risk of action by a country's government, which restricts its freedom. If a government tries to prevent the exploitation of its country by BBB it may take various measures. These measures include:</p> <ul style="list-style-type: none"> <li>• Quotas: Limiting the quantities of goods that can be bought from BBB and imported.</li> <li>• Tariffs: A tariff on goods imported by BBB therefore making locally produced goods more competitive.</li> <li>• Non-tariff barriers: Legal standard of safety or quality could be imposed on BBB.</li> <li>• Restrictions: Restricting BBB from buying other climbing wall companies.</li> <li>• Nationalisation: A government could nationalise foreign-owned companies and their assets.</li> <li>• Minimum shareholding: A government could insist on a minimum shareholding in companies by residents.</li> </ul> <p>BBB can limit the effects of political risk by:</p> <ul style="list-style-type: none"> <li>• Negotiations with the host government: The aim of these negotiations is to obtain a concession agreement.</li> <li>• Insurance: In the UK the Export Credits Guarantee Department provides protection against various threats.</li> <li>• Production strategies: It may be necessary to strike a balance between contracting out to local sources and producing directly.</li> <li>• Management structure: Possible methods include joint ventures or ceding control to local investors.</li> </ul>	
<p>Answers were fine if when they talked about political risk as required, but weaker candidates just talked about FOREX and hedging, or focussed on climbing wall regulations.</p>	
Total possible marks	8
Maximum full marks	6

<b>(e)</b>	
<p>The finance director should disregard the suggestion made by the contractor. He should act with integrity and not be corrupted by self-interest or the interests of other parties. He should also be objective in his dealings with the contractor and not be influenced by his assertion that it is acceptable to disregard safety standards and cut corners.</p>	
<p>Answers were fine where they used the language of ethics, however many just stated that it was unethical because it was unethical, also many candidates incorrectly thought that this was a money laundering issue.</p>	
Total possible marks	3
Maximum full marks	3

**Question 3****Total Marks:**

<b>General comments</b>																				
This was a six-part question that tested the candidates' understanding of the risk management element of the syllabus. The scenario was that a company had used derivative instruments to hedge risk that lock the company into one rate or asset price. The finance director of the company wished to know more about the use of financial options in risk management. Two risks in particular that the finance director was concerned about were the risks associated with buying shares and the interest rate risk associated with taking out loans																				
<b>(a)</b>																				
<b>Intrinsic value</b>																				
Only options that are in the money have an intrinsic value.																				
For the call options:																				
The call options with an exercise price of 280p are in the money and have an intrinsic value of 7p (287-280).																				
The call options with an exercise price of 290p are out of the money and have a zero intrinsic value.																				
For the put options:																				
The put options with an exercise price of 290p are in the money and have an intrinsic value of 3p (290-287).																				
The put options with an exercise price of 280p are out of the money and have a zero intrinsic value.																				
<b>Time value</b>																				
The time value is calculated by deducting the intrinsic value from the option premium:																				
	<table border="1"> <thead> <tr> <th rowspan="2">Exercise price</th> <th colspan="2">Calls</th> <th colspan="2">Puts</th> </tr> <tr> <th>January</th> <th>March</th> <th>January</th> <th>March</th> </tr> </thead> <tbody> <tr> <td>280</td> <td>1.5</td> <td>9</td> <td>1.5</td> <td>10.5</td> </tr> <tr> <td>290</td> <td>2.5</td> <td>11</td> <td>2.5</td> <td>13</td> </tr> </tbody> </table>	Exercise price	Calls		Puts		January	March	January	March	280	1.5	9	1.5	10.5	290	2.5	11	2.5	13
Exercise price	Calls		Puts																	
	January	March	January	March																
280	1.5	9	1.5	10.5																
290	2.5	11	2.5	13																
There were many weak answers to this part of the question; however there were some excellent answers, which demonstrated a good understanding of the characteristics of options.																				
Total possible marks	4																			
Maximum full marks	4																			

<b>(b)</b>	
The three factors that affect the time value of the options on Stickle's shares are:	
<ul style="list-style-type: none"> <li>• The time period to expiry of the option. The longer the time to expiry the more the option is worth.</li> <li>• The volatility of the market price of Stickle's shares. For example: If Sickle's share price becomes more volatile this will increase the probability of the options becoming either in the money or, if they are already in the money, becoming deeper in the money. This would increase the value of the options.</li> <li>• The general level of interest rates. The exercising of the option will be at some point in the future, and so the value of the option depends on the present value of the exercise price. For example for the call options on Stickle's share if interest rates rise the options will become more valuable.</li> </ul>	
Poorly answered which is surprising since this has been examined before. However, again, there were some excellent answers.	
Total possible marks	3
Maximum full marks	3

<b>(c)</b>	
The factors that affect the intrinsic value on Stickle's shares are:	
The exercise price:	
<ul style="list-style-type: none"> <li>• For a call option: The lower the exercise price in relation to the share price the higher will be the intrinsic value and this will make the option more valuable.</li> <li>• For a put option: The higher the exercise price in relation to the share price the higher will be the intrinsic value and this will make the option more valuable.</li> </ul>	
The share price:	
<ul style="list-style-type: none"> <li>• For a call option: As the share price rises the option becomes deeper in the money and more valuable as the intrinsic value increases. The reverse is the case for a fall in the share price.</li> <li>• For a put option: As the share price falls the option becomes deeper in the money and more valuable as the intrinsic value increases. The reverse is the case for a rise in the share price.</li> </ul>	
As with Part (a) there were many weak answers to this part of the question, however there were some excellent answers, which demonstrated a good understanding of the characteristics of options.	
Total possible marks	2
Maximum full marks	2

<b>(d)</b>	
Bridge can protect itself against a fall in the Stickle share price by holding put options that expire on 31 March 2016.	
The choice of exercise price will depend on the level of cover required and how much premium Bridge is willing to pay.	
If the Stickle share price is 250p at the end of March the results of holding put options will be as follow:	
<b>With an exercise price of 280p</b>	
Loss in the value of the shares $287 - 250 = 37p$	
Gain on exercising the put options $280 - 250 = 30p$	
Premium: 10.5p	
The maximum loss: $37 - 30 + 10.5 = 17.5p$	
Alternative: $287 - 280 + 10.5 = 17.5p$	
<b>With an exercise price of 290p</b>	
Loss in the value of the shares $287 - 250 = 37p$	
Gain on exercising the options $290 - 250 = 40p$	
Premium: 16p	
Maximum loss: $37 - 40 + 16 = 13p$	
Alternative: $287 - 290 + 16 = 13p$	
Many students successfully applied the knowledge that they had acquired from their studies of FTSE 100 index options. However basic errors included using calls instead of puts and picking the incorrect month of exercise.	
Total possible marks	4
Maximum full marks	4

**(e)**

To hedge against a rise in LIBOR from 0.62% pa during the period from 31 December 2015 to 31 July 2016. Bridge will need to hold September put options with an exercise price of 99.38 (100-0.62).

Using options on three month interest rate futures to hedge a seven month period, the number of contracts to be held is:  $(£20 \text{ m} / £0.5 \text{ m}) \times (7/3) = 93.33$  round to 93 contracts.  
This leaves the company slightly under hedged.

The premium payable is:  $93 \times 0.52\% \times 0.5\text{m} \times 3/12 = £60,450$

The results of the hedge on 31 July 2016 are as follows:

**(i) LIBOR is 0.80% pa and the futures price is 99.15.**

Exercise the options? Yes, since the exercise price is 99.38 and more than the futures price.

Gain on futures:  $99.38 - 99.15 = 0.23\%$ .  $0.23\% \times 0.5\text{m} \times 93 \times 3/12 = £26,738$ .

Borrowing cost:  $0.80 + 4.00 = 4.80\%$  pa.

Total interest payable to the bank:  $20\text{m} \times 0.048 \times 7/12 = £560,000$

Net cost of the loan including the option premium:  
 $560,000 + 60,450 - 26,738 = £593,712$

The effective interest rate is:  $(593,712/20\text{m}) \times (12/7) = 5.09\%$  pa

Alternative:  $\text{LIBOR} + 4.00 - \text{Gain on exercise} + \text{premium} = 0.80 + 4.00 - 0.23 + 0.52 = 5.09\%$  pa

**(ii) LIBOR is 0.40% pa and the futures price is 99.66**

Exercise the options? No, since the exercise is 99.38 and less than the futures price.

Borrowing cost:  $0.40 + 4.00 = 4.40\%$  pa

Total interest payable to the bank:  $20\text{m} \times 0.044 \times 7/12 = £513,333$

Total cost including the option premium:  $513,333 + 60,450 = £573,783$

The effective interest rate is:  $(573,783/20\text{m}) \times (12/7) = 4.92\%$  pa

Alternative:  $\text{LIBOR} + 4.00 + \text{premium} = 0.40 + 4.00 + 0.52 = 4.92\%$  pa

This has been examined before yet there were many basic errors which included using calls instead of puts, incorrect number of contracts, the wrong date for the contracts, inability to calculate an effective interest rate.

Total possible marks	10
Maximum full marks	10

<b>(f)</b>	
<p>The advantage of using options on interest rate futures rather than FRAs or interest rate futures is that Bridge can hedge the downside risk (LIBOR rising) and take advantage of upside potential (LIBOR falling). Whereas both FRAs and interest rate futures will lock Bridge into an estimate of LIBOR on 31 July 2016. The options will set a maximum on the interest rate that Bridge will have to pay. However the major disadvantage of using options on interest rate futures is the cost of the premium.</p> <p>Both options on interest rate futures and interest rate futures are traded instruments and there is a liquid market. Should Bridge not require the loan on 31 July 2016 it can close out the contracts. There will be margin requirements and there is the possibility of having to meet margin calls. With both these instruments basis risk exists and it is not possible to construct a perfect hedge since the contracts are in standard sizes of £500,000.</p> <p>FRAs on the other hand are over the counter instruments and can be tailor made to Bridge's requirements. The disadvantage being that there is no liquid market for the FRAs should Bridge not need to borrow the £20m on 31 July 2016.</p>	
Well answered by the majority of candidates.	
Total possible marks	9
Maximum full marks	7