

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: 35****General comments**

This was a five-part question, which tested the candidates' understanding of the investment decisions element of the syllabus.

The scenario of the question was that a company is launching a new product onto the market.

Part 1.1 of the question covered ENPV (expected NPV) analysis using probabilities.

Part 1.2 of the question required sensitivity calculations and discussion.

Part 1.3 of the question required knowledge of using expected values.

Part 1.4 of the question discussed the real options available to the company.

Part 1.5 of the question discussed an ethical issue.

1.1

The Supertape Project

	<u>0</u> £ millions	<u>1</u> £ millions	<u>2</u> £ millions	<u>3</u> £ millions
Contribution		8.40	9.08	9.82
Initial marketing	-0.80			
Selling and admin		-2.00	-2.08	-2.16
Fixed costs		-0.75	-0.75	-0.75
Rent forgone	-1.00	-1.00	-1.00	
Operating cash flows	-1.80	4.65	5.25	6.91
Tax 17%	0.31	-0.79	-0.89	-1.17
After tax operating cash flows	-1.49	3.86	4.36	5.74
Plant and equipment	-4.00			0.50
Tax saved on Cas	0.12	0.10	0.08	0.29
Working Capital	-3.00	-0.25	-0.27	3.52
Net cash flows	-8.37	3.71	4.17	10.05
PV factors at 10%	1.00	0.909	0.826	0.751
Present value	-8.37	3.37	3.44	7.55
ENPV	5.99			

Research cost of £0.5 million should be ignored since they are a sunk cost.

The project should be accepted since it has a positive ENPV, which will increase shareholder's wealth.

The discount rate: $((1.07) \times (1.024))^{-1} = 0.09568$. Round to 10%

Sales and Contribution

<u>Probability</u>	<u>Packs</u> <u>m</u>	<u>Sales @ £5</u> <u>per Pack</u> <u>£m</u>	<u>Prob x</u> <u>Sales</u> <u>£ m</u>
0.5	4	20	10.00
0.3	2	10	3.00
0.2	1	5	1.00
Expected Sales			14.00

Contribution Y1 = £8.40 m (14.00 x 0.60)

The contribution will be increase each year by volume and sales price increase:

Y2: $8.4 \times 1.05 \times 1.03 = 9.08$

Y3 $9.08 \times 1.05 \times 1.03 = 9.82$

Capital allowances and the tax saved thereon

<u>Cost/WDV</u>	<u>CA</u>	<u>Tax</u>
4.00	0.72	0.12
3.28	0.59	0.10
2.69	0.48	0.08
2.21		
-0.5	1.71	0.29

Working capital:

Y1 $(3.0 \times 1.05 \times 1.03) - 3 = (0.25)$

Y2 $(3.25 \times 1.05 \times 1.03) - 3.25 = (0.27)$

Y3 3.52.

Most of the attempts at this question were good however common errors were: Not stating why the research costs should be ignored i.e that they are sunk costs; incorrect timing of cash flows; inflating cash flows when it is stated that they remain constant; inflating the net cash flows by the general level of inflation; not using the Fisher formulae to calculate the nominal cost of capital and merely adding the general level of inflation to the real cost of capital; discounting money net cash flows by the real cost of capital.

Total possible marks

19

Maximum full marks

19

1.2

The sensitivity of the Supertape project to changes in sales revenue:

Contribution X (1-0.17)	6.97	7.54	8.15
PV factors at 10%	0.909	0.826	0.751
Present Value	6.34	6.23	6.12
Total present value	18.69		

Sensitivity 5.99/18.69	32.05%
A fall in sales from £14 million to: $14(1-0.3205) = £9.51$ million will result in a zero NPV.	
There is a 50% chance that sales will be £10 m or less and the management of Physiotec will have to consider whether it is willing to accept this level of risk. Especially since this is a very competitive market and it is possible that another product similar to Supertape might be marketed by a rival company.	
Mainly well answered however the examiners observed an error that has not occurred in past sensitivity questions. Some candidates attempted to calculate sensitivity using units (rather than £ contribution), going as far as taxing them and discounting them. Some other, common, errors were: calculating sensitivity using sales rather than contribution; ignoring tax; inverting the sensitivity calculation; inadequate narrative and not referring to the probabilities provided.	
Total possible marks	6
Maximum full marks	5

1.3	
Advantages:	
<ul style="list-style-type: none"> The information is reduced to a single number for assessing the Supertape project rather than a range of outcomes. Easily understood. 	
Disadvantages:	
<ul style="list-style-type: none"> The probabilities of the different sales levels may not be accurate. The expected sales of £14 million may not correspond to any of the possible expected sales levels. The expected sales of £14 million will not be achieved unless the project is run many times. The expected sales of £14 million are an average and it does not consider the spread of possible results. It therefore ignores risk. 	
Quite poorly answered with many candidates clearly making up answers and showing little understanding of the advantages and disadvantages of using expected values.	
Total possible marks	4
Maximum full marks	4

1.4	
The option to delay. Since a competitor is likely to enter into the market in one year's time it might be prudent to start the project in one year rather than now on 31 December 2018. The product might be not as good as Supertape or it might be better. Physiotec can make a more informed decision when it knows what the competitor is intending.	
The option to abandon. Since expected values are being used to estimate sales if the worst case scenario occurs, sales of only 1 million, Physiotec can abandon the project.	
Follow on options. Producing Supertape might allow Physiotec to develop future products, which can be marketed after 31 December 2021, even if the lower level of sales of 1 million occurs and the project initially has a negative NPV.	
Growth options. Physiotech could develop new markets for Supertape eg overseas which may turn a negative NPV project (initial sales 1 million) into a positive.	
A lot of very good answers, however poorer candidates did not refer to the scenario. The examiners would like to emphasise that this is very important to gain high marks. Also many candidates provided a list of every real option that they could think of. Candidates should be aware when two real options are asked for only the first two are marked.	
Total possible marks	4
Maximum full marks	4

1.5	
<p>The finance director of Physiotec should disregard the sales director's suggestion since this would be misleading shareholders and the markets. The finance director would not be acting in an ethical manner if he tried to hide the fact that the sales level of 4 million is not certain and that there is only a 50% probability of that level occurring. He would be breaching the fundamental principles of Integrity, Objectivity, Professional competence and due care and Professional behaviour.</p> <p>There are also legal considerations to consider since the professional accountant must be aware of and comply with current legislative and regulatory measures. Therefore, as well as being unethical, making this announcement would be illegal.</p>	
Good answers however many candidates omitted the legal aspects.	
Total possible marks	3
Maximum full marks	3

Question 2**Total Marks: 30**

This was a five part question that tested the candidates' understanding of the risk management element of the syllabus.

The scenario of the question was that a company imports goods from the USA and sells them in the UK.

Part 2.1 (a) required computations regarding hedging short-term interest rate risk.

Part 2.1 (b) required discussion regarding the techniques used to hedge the short-term interest rate risk.

Part 2.2 (a) required computations regarding FOREX.

Part 2.2 (b) required advice regarding the techniques that have been used to hedge the FOREX.

Part 2.3 required a discussion regarding economic risk.

and the Eurozone. Also the company was taking out a loan to buy a new warehouse.

2.1 (a)

LIBOR	1.25%	0.60%
LIBOR + 3	4.25%	3.60%
FRA Pay to lenders	4.25%	3.60%
Pmt to bank	0.25%	0.90%
FRA rate	4.50%	4.50%
Interest cost for 12 months	£36,000	£36,000
Option - Exercise	Yes	No
Pay interest at	4.00%	3.60%
Premium	1.00%	1.00%
Effective rate	5.00%	4.60%
Interest cost for 12 months	£40,000	£36,800

Responses to this part of the question were quite good with many candidates scoring almost full marks. However weaker candidates made some of the following mistakes: calculating interest payable for a five month period and misreading the question which states that the borrowing will be for one year and will take place on 30 April 2019, which is five months from 30 November 2018; lack of understanding of FRAs, which are OTC and treating them like futures; treating the OTC interest rate option as an option on interest rate futures

Total possible marks	6
Maximum full marks	6

2.1 (b)

If LIBOR increases to 1.25% the FRA is better than the option by £4,000.

If LIBOR decrease to 0.60% the FRA is slightly better than the option by £800.

The decision on whether to hedge depends on the board's attitude to risk as for both the interest rates given not hedging is cheaper.

If LIBOR does fall (one board member) the option allows upside potential and could be cheaper than the FRA but would never be cheaper than not hedging.

But given that the overall view of the board is that LIBOR will rise it would depend on how far the board believes it would rise. LIBOR would need to rise to over 1.5% before the FRA is cheaper than doing nothing and by over 2% before the option is cheaper.

Reasonable answers however common errors include: no recommendation given and just advantages and disadvantages; no consideration of not hedging as an alternative.

Total possible marks	3
Maximum full marks	3

2.2 (a)	
<p>The forward rate is: \$/£ 1.4017 (1.3965+0.0052) This is result in a sterling payment of $(\\$1,250,000/\\$1.4017) = \text{£}891,774$</p> <p>Using the money markets, NAC will invest in \$, \$ at the spot rate and borrow in £. Invest $\\$1,250,000/(1+0.044 \times 4/12) = \\$1,231,932$ Buy \$ spot $\\$1,231,932/\\$1.3965 = \text{£}882,157$ Borrow in £ to give total cost $\text{£}882,157 \times (1+0.0375 \times 4/12) = \text{£}893,184$</p> <p>Over the counter option. Using a call option to buy \$: Exercise price \$1.4025. If spot is \$1.3980 exercise the option. The option premium is $\\$1,250,000 \times \text{£}0.006 = \text{£}7,500$. The premium with interest is $\text{£}7,500 \times (1+0.0375 \times 4/12) = \text{£}7,594$ The sterling payment will be $(\\$1,250,000/\\$1.4025) + \text{£}7,594 = \text{£}898,860$</p>	
<p>Responses to this part of the question were mainly good but common errors were: for the forward contract using the incorrect exchange rate and deducting instead of adding the forward discount; for the money market hedge choosing the incorrect interest rates, incorrect apportionment of the annual interest and using the incorrect spot rate; for the OTC option choosing the put rather than the call, not taking account of the interest on the option premium, treating the OTC option as a traded option and incorrect exercise or abandon decisions.</p>	
Total possible marks	9
Maximum full marks	9

2.2 (b)							
<p>Results of hedging using various methods:</p> <table> <tr> <td>Forward</td> <td>£891,774</td> </tr> <tr> <td>Money market</td> <td>£893,184</td> </tr> <tr> <td>Option</td> <td>£898,860</td> </tr> </table> <p>If no hedge the payment will cost: $\\$1,250,000/\\$1.3980 = \text{£}894,134$,</p> <p>The forward contract and money market hedge lock NAC into an exchange rate. The options however protect NAC against the downside risk of the £ weakening more than expected against the \$ and allow for the upside potential of the \$ weakening against the £, however the option premium is expensive.</p> <p>In addition to the above some specific advantages and disadvantages include:</p> <p>Forwards: Tailored specifically for NAC However there is no secondary market. .</p> <p>Money market hedge: The money market hedge is more difficult to arrange than a forward contract and might use up NAC's credit lines.</p> <p>OTC currency options: There is no secondary market</p> <p>It is unlikely that the \$ is going to weaken enough to cover the cost of the option premium, therefore it is not recommended that the company use OTC foreign currency options. The forward contract and money market hedge are both better than the spot rate, however the forward is the cheapest. It is recommended that NAC use a forward contract to hedge the forex.</p>		Forward	£891,774	Money market	£893,184	Option	£898,860
Forward	£891,774						
Money market	£893,184						
Option	£898,860						
<p>Responses to this part of the question were mixed, with quite a few candidates not giving advice.</p>							
Total possible marks	9						
Maximum full marks	8						

2.3	
<p>NAC is an importer and exporter. It buys cars in \$, exports some to the Eurozone and receives payment in €. If over a period of several years the pound weakens (although the data in the question indicates that it is strengthening) against the dollar and appreciates against the euro the sterling value of NAC's income will fall and its net cash flows decline. This will reduce the value of the business (PV of future cash flows).</p>	
<p>Responses to this part of the question were poor with quite a lot of candidates showing a lack of understanding of what economic risk is and how it affected the company.</p>	
Total possible marks	4
Maximum full marks	4

Question 3**Total Marks: 35**

This was a four part question that tested the candidates' understanding of the financing options element of the syllabus.

The scenario of the question was that a company is diversifying its operations and raising finance by either debt or equity.

Part 3.1 required cost of capital computations before the diversification.

Part 3.2 required computations regarding a cost of capital appropriate for the diversification.

Part 3.3 required gearing calculations if the diversification is financed by debt or equity.

Part 3.4 required a discussion of from what source (debt, equity or a combination) the finance required for the diversification should be raised.

3.1

- (a) Growth can be estimated by past ordinary dividend growth for the past four years excluding special dividend as it's a one-off:

$$\text{Growth} = (141/105)^{(1/4)} - 1 = 0.0765 \text{ or } 7.7\%$$

$$\text{Shares in issue} = 190\text{m}$$

$$2017 \text{ dividends per share} = 74\text{p} (141/190)$$

$$\text{Ex div share price} = 4600\text{p}$$

$$K_e = (74(1.077)/4600) + 0.077 = 0.0943 \text{ or } 9.43\%$$

$K_d =$

Time	Cash flow £	Factors at 5%	PV £	Factors at 10%	PV £
0	(94)	1	(94)	1	(94)
1 - 4	4	3.546	14.18	3.170	12.68
4	100	0.823	82.30	0.683	68.30
			2.48		(13.02)

$$\text{YTM} = 5 + ((2.48/(2.48+13.02))^5) = 5.8\%$$

$$K_d = 5.8 (1-0.17) = 4.81\%$$

Market values:

$$\text{Equity } 190\text{m} \times \text{£}46 = \text{£}8,740\text{m}$$

$$\text{The total market value of debt} = 1,500 \times 0.94 = \text{£}1,410$$

$$\text{WACC} = (9.43 \times 8740 + 4.81 \times 1410)/(8740 + 1410) = 8.79\%$$

- (b) Using CAPM.

$$K_e = 3 + 0.74(9 - 3) = 7.44\%$$

This area has been examined many times before and there are adequate examples in the learning materials. However this part of the question was not well answered and common errors were: not stating that the special dividend should be ignored when calculating growth from past dividends; calculating growth from past dividends and using the 5th root rather than the 4th root; inverting the growth computation; confusion of digits between £ and pence; incorrect market value computations; when calculating the IRR of the debentures incorrect computations with two negative NPVs, incorrect IRR computation and omitting tax: when using the CAPM for k_e using the market return and not the market risk premium.

Total possible marks

11

Maximum full marks

11

3.2	
<p>The cost of equity will have to reflect the systematic business risk of the diversification and the financial risk. An appropriate equity beta will have to be selected. Bowlright's beta is affected by its diversification into bowling alleys and gyms. The Local does not operate in the gym market sector. The choice of equity beta is therefore that from Fitgroup, which is 0.56.</p> <p>We will have to consider whether the Fitgroup equity beta should be adjusted for financial risk. The gearing of Continental is: $(1410/8740) = 16\%$ and Fitgroups gearing is: $150/434 = 35\%$. The two gearing ratios are material different and gearing adjustments will have to be made:</p> <p>Degear: $0.56 = B_a (1 + ((150 \times 0.83)/434)) = 0.44$</p> <p>Regear: $B_e = 0.44 (1 + ((1410 \times 0.83)/8740)) = 0.50$</p> <p>$K_e = 3 + 0.50 (9 - 3) = 6\%$</p>	
<p>Answers to this part of the question were often weak common errors were: inadequate narrative on why an equity beta should be chosen from the samples of comparative companies given; choosing the incorrect comparator; using an average of all three or just two of the comparators; incorrect computations when degearing the equity beta, in some cases ending up with a higher asset beta than the equity beta; regearing the asset beta using Continental's book values; using clearly impossible equity betas in the CAPM, for example an equity beta of 28.</p>	
Total possible marks	8
Maximum full marks	8

3.3	
<p>(a) If the diversification is financed by debt the price of the debentures will fall to: $94 (1 - 0.05) = 89.3$ The market value of existing debt will now become: $1500 \times 0.893 = \text{£}1339.5\text{m}$ Total debt will be: $1339.5 + 1000 = \text{£}2339.5\text{m}$</p> <p>Gearing will be: $2339.5/8740 = 27\%$</p> <p>(b) If the diversification is finance by equity the price of the debentures will rise to: $94 (1 + 0.05) = 98.7$ The market value of debt will now become: $1500 \times 0.987 = 1480.5$ The market value of equity will be: $8740 + 1000 = \text{£}9740\text{m}$</p> <p>Gearing will be: $1480.5/9740 = 15\%$</p> <p>Note: These gearing figures are approximate since it is unlikely that the market value of existing equity will in reality remain the same after the diversification.</p>	
<p>Disappointing answers and common errors were: not recalculating the value of the existing debt; using a combination of book and market values; using just book values; using the incorrect measure of gearing i.e debt/debt + equity instead of debt/equity (despite the question stating, twice, that market values and debt/equity should be used).</p>	
Total possible marks	4
Maximum full marks	4

3.4		
Gearing:		
Current Gearing	If financed by debt	If financed by equity
16%	27% (from 3.3 above)	15% (from 3.3 above)
<p>The view of the board member that gearing is irrelevant has practical and theoretical implications as follows:</p>		

Practical Considerations:**Equity:**

Continental currently has gearing around the market average at 16% and financing the diversification by equity will change this to 15%, which is not materially different. Shareholders and the markets should not be worried about this change. However unless the equity is raised by way of a rights issue there might be control issues. Even if there is a rights issue there will be control issues for shareholders who do not wish to take up their rights. To ensure that a rights issue would be fully subscribed it is likely to be underwritten which will incur a cost. Dividends do not have to be paid unlike interest. If some of the equity comes from cutting the special dividend then this may upset shareholders and have an adverse impact on the value of the equity (signalling).

Debt:

Financing the diversification by debt will materially increase the gearing from 16% to 27%, it would be useful to know the maximum gearing in Continentals market sector. This increase may cause shareholders and the markets concern and it could have adverse implications for raising future debt finance. Debt interest has to be paid.

Combination of Debt and Equity:

Perhaps the most prudent way to finance the diversification would be to use both debt and equity in proportions that will maintain Continentals current gearing of 16% ie more equity than debt within the £1,000 million raised.

Theoretical Considerations:

As stated above from a practical viewpoint as stated above gearing does have implications. However from a theoretical point of view it is useful to look at the views of Modigliani and Miller (M&M).

In 1958 M&M showed that in a no tax world there is no advantage for firms to issue debt. There is therefore no optimal capital structure. However one of the main advantages of issuing debt is that the company gets tax relief on the interest. In 1963 M&M showed that, in the presence of corporation tax, it is advantageous for companies to issue debt.

The effect of interest being allowable against tax means that the higher the gearing the less tax a company will pay. This implies that Continental should not consider financing the diversification by equity at all and should only consider debt financing.

M&M stated that a company that has gearing is worth more than one that does not. This increase in value being due to the tax shield on debt. Since debt is cheaper than equity this implies that WACC will fall as gearing rises, hence increasing the value of the firm. Continental will therefore increase its value if it borrows the £1,000 million. In the extreme M&M 1963 suggests that the optimal gearing is 100%, however this is impractical and Continental would certainly risk bankruptcy if it were to gear up to this level.

The traditional theory (aka trade-off theory) suggests there is an optimal capital structure with a minimum WACC (and maximum firm value). If the 16% industry gearing is considered optimal by the market then both methods of finance move the company away from the optimal, increasing the WACC and reducing the company's value (more so in the case of debt).

Conclusion:

Although there is merit in what M&M state it would be prudent for Continental to consider the practical implications of financing the diversification as stated above and use a mix of debt and equity.

Given that the question set out four areas that should be addressed answers were disappointing in that not all the area were covered. Answers tended to be general and not related to the scenario of the question. The scenario stated that Continental's current gearing is near to the industry average and yet few candidates referred to this in their answers, nor calculated the current gearing. The question asked for theory but this should be related to the scenario and not just a mind dump of the theory.

Total possible marks	15
Maximum full marks	12