



**FINANCIAL MANAGEMENT, SYSTEMS AND
TECHNIQUES**

Certificate stage examination

6 December 2006

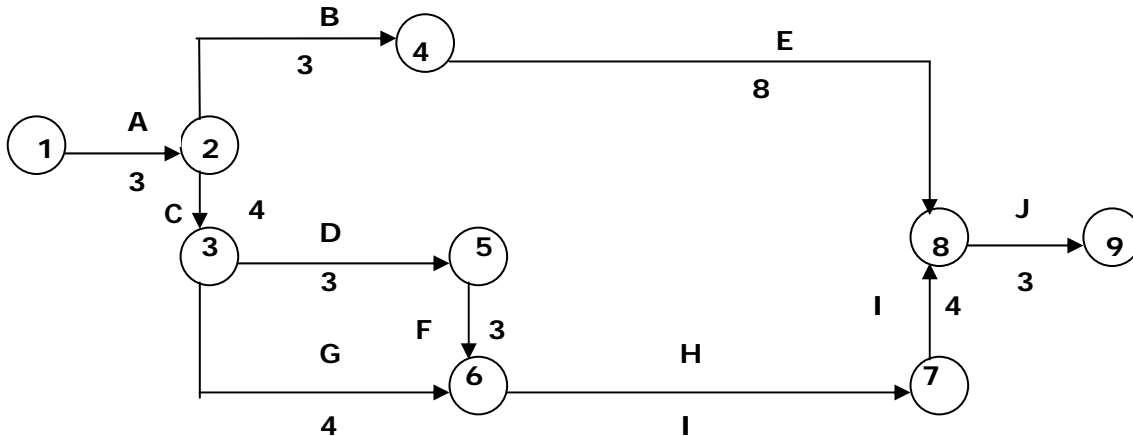
MARKING SCHEME



Question 1

Syllabus area D3; OLM Study Session 13

- (a) Draw a network diagram and use it to calculate
- The normal project time
 - Project costs based upon the normal duration



From the above the critical path is

ACDFHIJ and the normal duration of the project is 21 weeks

(the other paths are ABEJ – 17 weeks and ACGHIJ – 19 weeks)

The project would cost £60,000 + (21 x £4,000) = £144,000

2 marks for correctly and accurately drawn network plus 2 marks for normal duration and 2 marks for cost up to a maximum of (6)

- (b) Calculate the shortest time within which the project could be completed and the cost which would be incurred.

The shortest time will result from reducing the times of activities regardless of cost implications until it is impossible to make any further reductions.

Begin first with the activities that are common to all paths. These are activities A and J.

A	Reduce by 1 week	Costing £1,000
J	Reduce by 2 weeks	Costing £2,000

This reduces all of the paths by 3 weeks i.e.

ACDFHIJ – 18 weeks

ABEJ – 14 weeks

ACGHIJ – 16 weeks

Now concentrate upon the remaining critical path activities, noting that H and I can not be reduced. This leaves CDF. C is the cheapest to reduce and then F.

C	Reduce by 3 weeks	Costing £6,000
F	Reduce by 1 week	Costing £2,000

The position now is
ACDFHIJ – 14 weeks
ABEJ – 14 weeks
ACGHIJ – 13 weeks
i.e. ABEJ has also become critical (and ACGHIJ is very near becoming critical)

Any further reduction will involve more than one activity.

D can be reduced by 2 weeks but this will have to be matched by reductions to E (on ABEJ) and G (by 1 week on ACGHIJ).

D	Reduce by 2 weeks	Costing £10,000
E	Reduce by 2 weeks	Costing £9,000
G	Reduce by 1 week	Costing £1,500

The position now is
ACDFHIJ – 12 weeks
ABEJ – 12 weeks
ACGHIJ – 12 weeks

The project time can not be reduced further. The shortest time is 12 weeks. This would cost £60,000 + (12 x £4,000) + £31,500 additional costs = £139,500

5 marks for shortest time and 1 mark for cost up to a maximum of (6)

- (c) Draw a resource histogram to determine whether the shortest time could be achieved within the constraint of using only six members of staff.**

Students may construct a table showing EET and LET or they may simply revise their original network to show the effects of the reductions. Either way there is only one activity, G, which is non critical and which, therefore has any slack.

GANTT Chart

A	x	x																
B			x	x	x													
C			x															
D				x	x	x												
E						x	x	x	x	x	x	x	x					
F							x	x										
G				x	x	x	x	--										
H									x									
I										x	x	x	x					
J														x				
wk	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
staff	6	6	5	6	6	5	7	6	5	5	5	5	5	6				

This shows that there is only one week when the resource requirement can not be met – week 7. If activity F is delayed by one week this can be accommodated. The shortest time is not achievable.

6 marks for correctly and accurately drawing the GANTT chart. 2 marks for comment on whether time is achievable.

(8)

(20)

Question 2

Syllabus area E3; OLM Study Sessions 9 and 10

- (a) Using time series decomposition (additive method) forecast the demand for logged enquires during the four quarters of 2006.

	Enquiries	Moving ave.	Centred	Variation	Time period
2002					
Spring	7.5				
Summer	14.6				
		9.45			
Autumn	10.9		9.475	1.425	0
		9.5			
Winter	4.8		9.6125	(4.8125)	1
		9.725			
2003					
Spring	7.7		9.7125	(2.0125)	2
		9.7			
Summer	15.5		9.7125	5.7875	
		9.725			3
Autumn	10.8		9.7875	1.0125	
		9.85			4
Winter	4.9		9.8625	(4.9625)	
		9.875			5
2004					
Spring	8.2		9.9625	(1.7625)	6
		10.05			
Summer	15.6		10.1375	5.4625	
		10.225			7
Autumn	11.5		10.2125	1.2875	
		10.2			8
Winter	5.6		10.275	(4.675)	
		10.35			9
2005					
Spring	8.1		10.375	(2.275)	10
		10.4			
Summer	16.2		10.475	5.725	11
		10.55			
Autumn	11.7				12
Winter	6.2				13
2006	Forecast				
Spring	8.7309				14
Summer	16.4968				15
Autumn	12.1711				16
Winter	6.2036				17

Average quarterly increase in enquiries is $(10.475 - 9.475)/11 = 0.0909$

Forecast using

$$y = 9.475 + 0.0909x$$

Adjustment for quarterly variation

Year	Spring	Summer	Autumn	Winter
2002			1.4250	(4.8125)
2003	(2.0125)	5.7875	1.0125	(4.9625)
2004	(1.7625)	5.4625	1.2875	(4.6750)
2005	(2.2750)	5.7250		
Average	(2.0167)	5.6583	1.2417	(4.8167)

Marks to be awarded as follows

1 mark for moving average

1 mark for centring average

1 mark for variation

1 mark for forecast equation

2 marks for quarterly average figures

4 marks for calculation of forecast figures (1 mark per figure)

(10)

- (b) Determine whether there is a statistical correlation between the number of enquires and the percentage of vacancies in local tourist accommodation. Comment upon the usefulness of this information.**

No of enquiries X	% of vacancies y	x ²	y ²	xy
7.5	34	56.25	1156	255.0
14.6	8	213.16	64	116.8
10.9	21	118.81	441	228.9
4.8	46	23.04	2116	220.8
7.7	32	59.29	1024	246.4
15.5	12	240.25	144	186.0
10.8	20	116.64	400	216.0
4.9	48	24.01	2304	235.2
8.2	28	67.24	784	229.6
15.6	11	243.36	121	171.6
11.5	17	132.25	289	195.5
5.6	51	31.36	2601	285.6
8.1	27	65.61	729	218.7
16.2	7	262.44	49	113.4
11.7	15	136.89	225	175.5
6.2	42	38.44	1764	260.4
159.8	419	1829.04	14211	3355.4

4 marks for the table

$$r = \frac{n\sum xy - \sum x\sum y}{\sqrt{(n\sum x^2 - (\sum x)^2)}\sqrt{(n\sum y^2 - (\sum y)^2)}}$$

$$r = \frac{16 \times 33554.4 - 159.8 \times 419}{\sqrt{(16 \times 1829.04 - 159.8^2)} \times \sqrt{(16 \times 14211 - 419^2)}}$$

$$r = \frac{53868.4 - 66956.2}{\sqrt{3728.6} \times \sqrt{51815}}$$

$$r = \frac{-13269.8}{61.0622 \times 227.6291} = \frac{-13269.8}{13899.5} = \underline{-0.95}$$

3 marks for calculation

The correlation coefficient shows a negative correlation i.e. that the higher the number of enquiries the lower the percentage of vacancies. This is a strong relationship, but it should be treated with the same caution. There is no guarantee of a causal relationship between the two variables. In themselves the figures would help to support the case for the continued operation of the Information Centre.

1 mark for comment and other relevant points to a maximum of 3

(10)

(20)

Question 3

Syllabus area B1. Study session 1 and learning activity/self assessment question 1.4

(a) Identify and explain each of Porter's five competitive forces

The five forces are:

- (1) The threat of new entrants.
How easy is it for new entrants to gain access to the industry and its markets?
This will have an impact upon the current market and its future stability.
- (2) The bargaining power of suppliers.
If suppliers perceive themselves to be in a strong position they can exert pressure upon their customers. It may be possible to make use of monopoly powers and to lock customers in and dictate to them.
- (3) The bargaining power of customers.
Customers may be strong when they have individual power due to the size of their business and/or when it is relatively easy for them to switch suppliers in the market.
- (4) The threat of substitute products or services.
Substitute products may have an effect upon demand when customers perceive them to give an equivalent value to existing products.
- (5) Rivalry amongst existing competitors.
This determines the immediate competitive position of an industry and is determined by the number of players within the industry and their relative strengths.

*1 mark for each of the five forces but only where there is some explanation offered.
If the force is simply referred to award half mark. Maximum of (5)*

(b) Describe how information systems can be used to achieve competitive advantage

Chaffey (2003,54) lists the following ways in which IS can help to achieve competitive advantage

- Improvement in operational efficiency – e.g. in manufacturing systems or through the reduction in administrative costs.
- Barriers to entry – heavy investment in IS can lead to organisations using expensive and complex systems which it would be difficult for new entrants to replicate.
- Locking in customers and suppliers – building up links and integration with suppliers and customers can have business benefits and may make it difficult for rivals to develop in the market place.
- Promoting business innovation – may result in the development of new products, methods of delivery etc.

- Increasing switching costs – the greater the investment in IS and in integrated systems the less easy it will be for organisations and their rivals to switch to other suppliers, customers etc.
- Leverage – IS may provide access to a resource base developed originally for an alternative business use e.g. mailing lists from customer records.

*1 mark for each relevant point but only where there is some explanation offered.
If the point is simply referred to award half mark. Maximum of (5)*

(c) Discuss the applicability of the concepts you have described above to the public services sector using an organisation with which you are familiar to provide illustrative evidence

The problem with much of the work on competitive environments and competitive advantage is that it may not be fully applicable in the public sector which does not possess the same competitive imperatives.

The final part of this question requires a general discussion relating to the applicability of the concepts discussed previously. Answers are likely to vary considerably depending upon what has been written previously.

Some issues which could be raised are

- The nature of public sector organisations and the services they provide
- Who are the customers of public sector organisations and how do they differ from the private sector
- Competition within the public sector and initiatives such as Best Value
- Specific discussion of the use of IS in this context

Some discretion will have to be used in the award of marks.

1 mark for each valid point up to a maximum of (5)

(15)

Question 4

Syllabus area A2; OLM Study Session 17

- (a) Calculate the EOQ and the number of orders required to meet annual demand for the components, and the cost of using this approach.

Holding costs are $0.11 + 0.08 + 0.02 + 1.00 = \text{£}1.21$

$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2CD}{H}} && 1 \\ &= \sqrt{(2 \times 60 \times 8000) / 1.21} \\ &= 890.7235 = \underline{890 \text{ or } 891} && 1 \end{aligned}$$

No of orders is $8000 / 890$ or $8000 / 891 = 8.988$ or $8.978 = 9$ orders per annum 1

Ordering costs are $9 \times 60 = \text{£}540$ 1

Holding costs are $890 / 2 \times 1.21 = 538.45$ 1

Total cost = $\text{£}540 + \text{£}538.45 + \text{£}80,000$ (purchase cost is $\text{£}10 \times 8,000$) 1
= $\text{£}81,078.45$

(6)

- (b) Explain why the EOQ method is able to calculate the minimum costs of the ordering process and outline the main assumptions which it makes

The EOQ method assumes that there are two main types of cost, ordering cost and holding cost. It also assumes that there is an inverse relationship between the two types of cost. If you place fewer orders then you will hold more stock. This will reduce ordering costs but increase holding costs. The reverse situation is also true. Total costs are minimised where ordering cost is equal to holding cost (assuming no buffer stocks) although in practice there may need to be some rounding taking place as only whole numbers of items and orders can be used. (A graph may be used to illustrate this)

2 marks for explanation

The main assumptions are

- There is a known demand for the stock
- There is constant usage of the stock items over the period
- The quantity ordered does not vary over time
- The order cost per item can be estimated and is constant
- Other variables are fixed over time
- The stock replenishment is instantaneous when the stock level has reached zero
- There are only two types of cost under consideration and there is an inverse relationship between them

½ mark for each assumption subject to a maximum of 3

(5)

(c) Could EGP make any savings by taking up the offer of the alternative supplier?

The offer would involve placing only one order per year.

$$\text{Ordering cost} = 1 \times £60 = £60$$

$$\begin{aligned} \text{Holding cost} &= 8000/2 \times 1.21 = 4,840 \\ (0.11 + 0.08 + 0.02 + 1.00 &= 1.21) \end{aligned}$$

$$\begin{aligned} \text{Total annual cost} &= £4,900 + £76,000 \text{ (purchase price is } £9.50 \times 8000) \\ &= £80,900 \end{aligned}$$

This is a saving of £178.45

EGP could make savings by taking up the offer.

3 marks for calculation plus 1 mark for a conclusion subject to a maximum of (4)

(15)

Question 5

Syllabus areas A1 and A5; OLM Study Sessions 16 and 20

- (a) Explain the terms gearing and working capital cycle. What does the gearing ratio measure?**

Gearing relates to a company's long term capital structure. It is concerned with the relative amounts of debt finance and equity finance which make up the whole of the capital. This is because debt finance or, to widen it out to include preference shares, prior charge capital is a commitment which must be serviced out of profit before equity shareholders can be paid. The gearing ratio is the ratio of prior charge capital to total capital.

2

The working capital cycle is the whole period from purchasing of the raw material through to receipt of payment for the finished product. The company must invest in the purchase of raw material stock, work in progress, finished goods stock and debtor financed sales until cash is actually received.

2

(4)

- (b) Calculate the gearing ratio and the working capital cycle for the years 2004 and 2005**

The capital gearing ratio is calculated using

Gearing = prior charge capital/ total capital

For 2004 this is $(1.7 + 1.4) / (1.7 + 1.4 + 1.8 + 0.8) = 3.1 / 5.7 = 54.4\%$

For 2005 this is $(2.7 + 1.4) / (2.7 + 1.4 + 1.8 + 0.9) = 4.1 / 6.8 = 60.3\%$

2

The working capital cycle (or cash conversion cycle) is calculated as Inventory conversion period + debtor conversion period – creditor deferral interval

The question indicates that the daily cost of sales may be used for the inventory conversion period as a whole (as only one stock figure is given in the question).

Inventory conversion period 2004 = $0.7 / (3.0/365) = 85$ days

Inventory conversion period 2005 = $0.7 / (3.6/365) = 71$ days

1

Debtor conversion period 2004 = $1.0 / (5.2/365) = 70$ days

Debtor conversion period 2005 = $1.3 / (6.2/365) = 77$ days

1

Creditor deferral period 2004 = $0.6 / (2.1/365) = 104$ days

Creditor deferral period 2005 = $1.0 / (2.8/365) = 130$ days

1

Working capital cycle 2004 = $85 + 70 - 104 = 51$ days

Working capital cycle 2005 = $71 + 77 - 130 = 18$ days

1

(6)

(c) Comment upon the results of your calculations.

The gearing ratio for 2004 is already high at 54.4% (50% is generally regarded as high gearing). In 2005 this ratio becomes even higher and there is a danger that the company may run into difficulties if it can not generate sufficient profit to finance the additional debt (increase in debenture stock). At some point the company may begin to find difficulty in raising additional capital other than through the issuing of further equity. This would, however, have an impact on other key ratios.

2 marks for comments on the gearing ratio

The working capital position seems to have improved significantly from 2004 to 2005. There have been marked improvements in the management of inventory and this has been achieved against a scenario of increasing activity and sales. The worrying aspect of this is the extent to which the improvement is reliant upon taking more credit from suppliers. The debtor conversion period has also deteriorated. The company's product appears to be quite raw material intensive in its manufacture which means that the company is dependant upon maintaining good relations with its suppliers. These relationships can not be sustained if the goodwill of suppliers runs out. The liquidity situation also appears to be worrying as cash decreases and the overdraft increases. The company appears to have both short and long term financing concerns which will need to be addressed.

3 marks for comments on working capital position

(5)

(15)

Question 6

Syllabus areas E2 and B3; OLM Study Sessions 8 and 2

As Management Accountant the General Manager has asked you for advice.

- (a) **Test the hypotheses that the performance in respect of average payment time and the incidence of error as revealed in the sample check is compatible with the claims made by Kirkdale Council. Use the 5% level of significance but also comment upon whether your findings would differ at 1%.**

There are two separate hypotheses to test here. Each requires a slightly different approach from the other.

The first hypothesis is based upon the Council's assertion that the average time in which invoices are paid is 28 days. The implication from the sample data is that the population mean is greater than 28 days, therefore a one tail test should be used (but a two tail test would be acceptable).

$$H_0 : \mu = 28$$

$$H_1 : \mu > 28$$

The critical value for a one tail test at 5% level of significance is 1.64

Calculate Z score for the sample

$$z = \frac{\bar{x} - \mu}{\sqrt{s^2/n}} \quad \text{or} \quad \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

$$z = \frac{30 - 28}{\sqrt{6^2/100}}$$

$$z = \frac{2}{0.6} = 3.33$$

This exceeds the critical value and therefore the null hypothesis is rejected. The sample evidence does not support the Council's assertion.

The second assertion made by the Council is that the error rate is 1%. The sample shows that 3% were incorrect. Again it can be assumed that a one tail test would be appropriate and that, therefore, the critical value would be 1.64.

The hypothesis is

$$H_0 : p = 0.01$$

$$H_1 : p > 0.01$$

$$Z = (p - n) / \sqrt{[n(100 - n)/n]} = (3 - 1) / \sqrt{[1(100 - 1)/100]}$$

$$Z = 2/\sqrt{0.99} = 2.01$$

This again exceeds the critical value and therefore the null hypothesis is rejected. The evidence from the sample is not consistent with the assertion made by the Council.

At the 1% level of significance the critical value is 2.33. This means that the result of the first test remains the same but for the second test the critical value is less than the Z score. In this case the null hypothesis is not rejected. At the 1% level of significance there is insufficient evidence to contradict the Council's assertion.

1

(10)

(b) Outline the general advantages and disadvantages of using off the shelf systems and comment upon the appropriateness of using the approach in this situation.

The advantages of off the shelf systems are:

- Standard generic systems are easily available.
- Products are often very reliable having been well used and tested.
- They are often relatively cheap to purchase and install.
- Delivery times are good.
- They do not rely upon a large degree of in house expertise.

On the other hand there may be disadvantages:

- They may not fit precisely the needs of the organisation.
- They may not fit in with existing systems.
- Some degree of in house expertise is required.
- May need to make changes to fit in with requirements of system.

½ mark per point subject to a maximum of 3. Other relevant points may be awarded marks

AA needs to consider why the situation seems to have deteriorated over the last few years. They are being provided with a low cost service albeit within a loose contractual framework. They need to consider the full implications of going independent. What additional costs might they incur? What guarantee would there be that a new system would be what they wanted and would actually solve their problems? How would new systems fit in with their existing systems? A better approach might be to go back to the Council and discuss with them their concerns in order to try to improve the present position. Some form of performance monitoring and, perhaps, a more formal contract might help.

2 marks for a general discussion of the issues and the likely impact on AA of using an off the shelf system.

(5)

(15)

Question 7

Syllabus areas E2 and E3; OLM Study Sessions 7 and 8

- (a) What does it mean when the council is described as “risk averse” and how will expected values help in this context?**

The council is risk averse which means it does not want to take risks which it feels may be unwarranted. The council is spending public money and is in a relationship of trust with its local taxpayers. It would be wrong for the council to gamble with this money. Expected values produce the most likely outcome and avoid the extreme situations which might occur. By adopting the expected value the council is seeking to minimise risk.

2 marks for an explanation of risk averse and how this relates to expected values

(2)

- (b) Calculate the expected value of the annual contribution due to the refurbishment work**

The expected value calculation is based upon the weighted probabilities of the outcomes.

Demand level	Contribution £	Probability %	Expected value (EV) £
High	250,000	25	62,500
Medium	200,000	40	80,000
Low	150,000	35	52,500
Overall EV			195,000

(2)

- (c) Using the expected value figure from above calculate the net present value and the internal rate of return of the proposed refurbishment scheme**

Initial outlay is £1.5m which will be incurred at the outset of the project (in year 0).

1

The contribution will be £195,000 and there are additional fixed costs of £15,000 per annum. This gives a net cash inflow of £180,000 per annum for ten years.

1

The present value of an annuity over 10 years at 6% is 7.36. This gives a present value of 180,000 over 10 years of $180,000 \times 7.36 = 1,324,800$

1

Overall the net present value (NPV) is $-1,500,000 + 1,324,800 = -£175,200$

1

The internal rate of return (IRR) can be calculated by interpolation.

For example, the NPV at 3% is

$$-1,500,000 + (180,000 \times 8.53) = 35,400$$

1

$$IRR = A + \frac{C}{C-D} \times (B - A)$$

$$= 3 + (35,400 / 211,000) \times (6 - 3)$$

$$= 3 + 0.5 = \underline{3.5\%}$$

2

(7)

(d) Explain how NPV can be used to make decisions and comment upon your analysis in the light of this rule

The decision rules for NPV are

- When considering an individual project accept it if it gives a positive NPV
- Where projects are competing select the project with the highest NPV
- Where projects are competing but show a negative NPV select the project with the lowest negative NPV

This final point only really applies in the public sector and could be applied in this case. The project will give a negative NPV based upon the use of expected values although other assumptions on demand would give a better projected outcome. The IRR is calculated at 3.5% which is the rate of discount recommended by the Treasury for use in the public sector.

3 marks for decision rules plus 1 mark for comment subject to a maximum of (4)

(15)