

FINANCIAL MANAGEMENT, SYSTEMS AND TECHNIQUES

**June 2004
Certificate stage**

MARKING SCHEME



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Question 1

This question relates to learning outcome A3 and objectives 18.4, 18.5 and 18.6 in the OLM.

Answers should be in report format. They should be appropriately addressed, headed, and a formal style of writing should be used. The report should be sectionalised in accordance with the three sections of the question. The detailed calculations required for section (c) may be provided in an appendix to the report.

1 mark for good presentation taken from the allocation for part (b)

- (a) An assessment of the Baumol and Miller-Orr models which outlines their strengths and weaknesses and explains what benefits their usage could provide for Eastland.

Baumol

This model aims to determine the cash inflow which will minimise the total cost of holding funds. It takes a similar approach to the EOQ model for inventory management.

1

Strengths:

- Can minimise costs.
- Useful where cash flows are predictable and consistent over time.
- Easy to understand and use.

Weaknesses:

- Makes simplifying assumptions and can be unrealistic.
- Inapplicable where funding is through overdraft.
- May be additional costs of running out of cash.
- Does not work well where there are exceptionally small or large flows from time to time.
- Some costs may vary with the average amount of cash held.

½ mark per point subject to a maximum of 1 for strengths and 1 for weaknesses

2

Miller-Orr

This provides for a calculation of a target balance figure and a higher limit balance and recognises that there may be random changes in cash flow.

1

Strengths:

- Allows for random and unpredictable patterns and more closely resembles the real world.
- Provides basis for ongoing balance management through the provision of control limits and guidelines.
- Easy to use once calculations have been completed.

Weaknesses:

- Assumes instantaneous transfers of cash.
- Formula is complex and not easy to understand.
- Relies on knowledge of variables such as variance of daily cash flows.

½ mark per point subject to a maximum of 1 for strengths and 1 for weaknesses
2

Benefits to Eastland:

- Can provide cost savings through optimum use of investments.
- Improvement to cash management.
- Rational/empirical approach.

1 mark for each point subject to a maximum of 2
Other valid points should be awarded marks

(8)

- (b) A reasoned conclusion based upon the above assessment which recommends which of the approaches would be the most appropriate to the needs of Eastland.

1 mark for presentation as referred to above

This section should relate to strengths and weaknesses described above to the circumstances outlined in the question scenario.

Baumol model is not appropriate because expenditure is project based and is spread unevenly throughout the year. All other data required is available and Eastland has determined a minimum balance which would avoid the possibility of running out of cash.

Miller-Orr can cope with the fluctuations and unevenness of cash flow. All the data required is available including an assessment of the variance of daily cash flows.

The conclusion should be that Miller-Orr model is used.

2 marks for a reasoned argument leading to a valid conclusion. It is unlikely that marks would be given if the conclusion was reached that Baumol was the preferred model but marks should be awarded in exceptional circumstances

2

(3)

- (c) Using the preferred model and the data provided produce appropriate information to assist Eastland in managing its cash balances, and provide a full explanation of how the information should be used. It is unlikely that marks would be given for the use of the Baumol Model.

A series of formulae are used for the calculation of the target balance Z, the upper limit H and the average balance W.

$$Z = \sqrt[3]{\frac{3F\sigma^2}{4K}} + L$$

$$H = 3Z - 2L$$

$$W = (4Z - L) / 3$$

where, F is the transaction cost = £50

and σ^2 is the variance of daily net cash flows = £500

K is the daily opportunity cost of cash balances

$$K = \sqrt[D]{(1+R)} - 1 \text{ where } R \text{ is the rate (6\%), and } D \text{ is the number of days (365)}$$

$$K = \sqrt[365]{(1+0.06)} - 1 = 1.00016 - 1 = 0.00016 \quad 2$$

$$Z = \sqrt[3]{(3 * 50 * 500) / (4 * 0.00016)} + 5,000 = 489 + 5,000 = 5,489 \quad 2$$

$$H = 3 * 5,489 - 2 * 5,000 = 6,467 \quad 1$$

$$W = (4 * 5,489 - 5,000) / 3 = 5,652 \quad 1$$

Full explanation should include:

- The target balance is £5,489.
- When the balance falls to £5,000 an amount of £489 should be drawn from investments to reinstate target.
- When the balance rises to £6,467 an amount of £978 should be invested.

1 mark for each point, up to a maximum of 3

(9)

(20)

Question 2

This question relates to learning outcome E2 and objectives 7.2 and 7.3 in the OLM.

Answers should be in report format. They should be appropriately addressed, headed, and a formal style of writing should be used. The report should be sectionalised in accordance with the three sections of the question. The detailed calculations required for section (a) may be provided in an appendix to the report.

1 mark for good presentation taken from the allocation for part (a)

- (a) A probability pay off table which estimates the profit at each probability level and the expected profit at each price level.

The question requires an estimate of profit based upon operating a full programme of 15 courses. Where students have only calculated profit for a single course this is acceptable. The expected profit figures in this case would be:

- At £30 - £62.50
- At £25 - £67.50
- At £20 - £55.30

Price	Places (x 15 courses)	Revenue	Variable costs	Contribution	Bar etc contribution	Total contribution	Fixed costs	Profit	Probability	Profit *prob	Expected profit
30	225	6750.0	562.5	6187.5	337.5	6525.0	4500.0	2025.0	0.3	607.5	
	180	5400.0	450.0	4950.0	270.0	5220.0	4500.0	720.0	0.5	360.0	
	150	4500.0	375.0	4125.0	225.0	4350.0	4500.0	-150.0	0.2	-30.0	937.5
25	270	6750.0	675.0	6075.0	405.0	6480.0	4500.0	1980.0	0.3	594.0	
	225	5625.0	562.5	5062.5	337.5	5400.0	4500.0	900.0	0.5	450.0	
	180	4500.0	450.0	4050.0	270.0	4320.0	4500.0	-180.0	0.2	-36.0	1008.0
20	300	6000.0	750.0	5250.0	450.0	5700.0	4500.0	1200.0	0.5	600.0	
	270	5400.0	675.0	4725.0	405.0	5130.0	4500.0	630.0	0.4	252.0	
	225	4500.0	562.5	3937.5	337.5	4275.0	4500.0	-225.0	0.1	-22.5	829.5

½ mark for each probable profit figure plus 1 mark for each expected profit figure

7½

1½ marks for presentation (1 for report, ½ for format of figures)

1½

(9)

- (b) An assessment, at each price level, of the probability that a loss will be made on the programme of courses.

The highest expected profit would be given by charging £25 per person but this would have a 20% probability of making a loss. At £30, the next best expected level of profit the probability of making a loss is also 20%. The least profitable level (£20) is also the least likely to make a loss (10%).

(3)

- (c) Comment on the approach taken and on the results of the analysis, with recommendations on the action to be taken.

Points that could be made:

- Expected profit may not be the actual profit.
- The probabilities used are based upon subjective assessments and should not be taken as absolute figures.
- The amounts involved are not great and the margin between profit and loss is quite small.
- Attitude to risk may vary and although the £20 option offers a smaller profit the risk is also smaller.

1 mark per valid point subject to a maximum of 2

Recommendations should be made in line with the results of the analysis.

1

(3)

- (d) Suggestions on how sampling techniques could be used in future to improve the reliability and accuracy of the data used.

The probability figures used in the exercise are based upon subjective judgements made by the sports centre management and presumably based upon past experience. This data is clearly not as accurate and reliable as it could be.

This final section asks for suggestions for using sampling techniques to improve reliability. No calculations are required in this section of the answer.

Sampling is an important way of collecting primary data and could be done by way of either questionnaire or by interview. Sampling could be used here to test the views of potential customers in relation to the facility being offered and the range of prices being proposed.

Key issues to be considered

- Consideration of the different types of sampling that can be used and the distinction between random and non-random sampling.
- Appreciation of the statistical significance (or otherwise) of samples and the extent to which statistical inference can be used to make judgements on the whole population.

- Calculating the required sample size based upon balancing the desire for accuracy and the resources available to conduct the sample.
- Selection of the sample from the sampling frame.
- Use of sound questionnaire design and/or interviewing techniques.

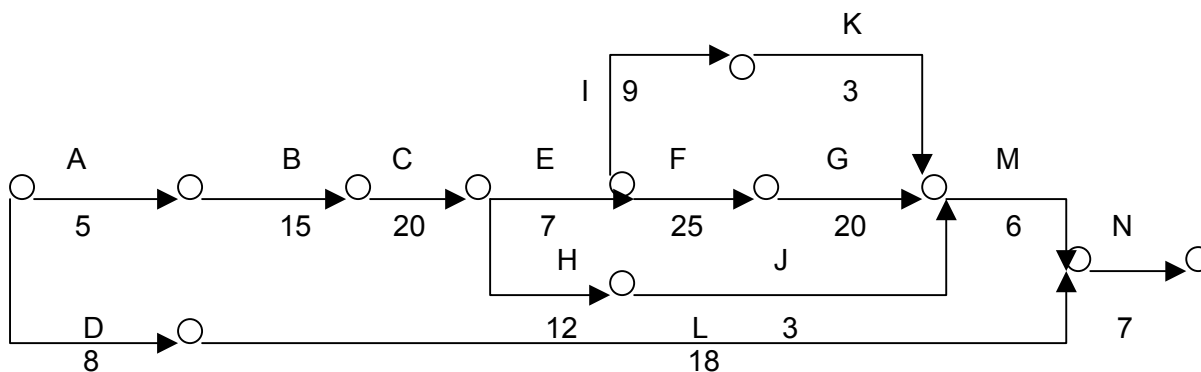
*1 mark to be awarded for each relevant point up to a maximum of 5
Marks may be awarded for other valid points
(5)*

(20)

Question 3

This question relates to learning outcome D3 and objectives 13.2, 13.3 and 13.4. in the OLM.

- (a) Draw a network diagram which shows the critical path of the project. Calculate the normal duration of the project based on the data provided.



3 marks for a fully correct diagram
 2 marks for a diagram which is correct in principle but which contains one mistake
 1 mark for a diagram which is correct in principle but contains two mistakes
 3

Critical path is ABCEFGMN. 1
 Normal time is 105 days. 1

(5)

- (b) Compare the normal duration with the time allowed for completion and suggest what changes in the project plan should be made to ensure that the time constraint is met. Take into account the budget available.

The work needs to be completed in 85 days but the initial network diagram produces a normal time of 105 days. There is a sum of £10,000 available to finance changes to the project plan.

If possible changes should not impinge upon other objectives. Activity G can be reduced but this will go against the design brief.

Changes will need to concentrate upon the critical path and should be done in the most cost effective way.

Activities B, C, F and N lie on the critical path.

N is too expensive – 1 day would cost £1,500.

B should be reduced first – 5 days at a cost of £200 per day = £1,000.

F is the next cheapest but if we wish to reduce C then we must take the full potential reduction of 12 days as a new contractor will be involved.

C should be reduced by 12 days at a cost of £8,000.

That leaves £1,000 in the budget which will finance two weekends working and a reduction in F of 4 days.

The work can now be done on budget and in a revised time of 84 days.

A more direct alternative would be to reduce C by 12 days and to work four weekends to reduce F by 8 weeks. This solution would also be acceptable and should be awarded full marks.

5 marks for an effective solution arrived at in a logical manner (3 marks may be awarded for a good attempt which does not solve the problem, and 1 mark for a nominal attempt)
(5)

- (c)** In relation to the requirements of this project describe the main benefits of using network analysis techniques and the weaknesses of this approach as a method of project management.

The main benefits of using network analysis techniques:

- Logical approach.
- Identifies all activities and inter dependencies.
- Helps to create plan.
- Good basis for monitoring based upon critical path.
- Can be used flexibly.

½ mark for each valid point to a maximum of 2½ marks

Against this the weaknesses are:

- Concentrates upon one aspect of project management.
- May miss the bigger picture.
- Does not take into account soft success criteria.
- Ignores people aspects of project management.
- May be too prescriptive.

*½ mark for each valid point to a maximum of 2½ marks
Plus other valid points*
(5)

(15)

Question 4

This question relates to learning outcome B3 and objectives 2.4 and 2.5 in the OLM.

- (a) Suggest FIVE ways in which traditional methods could fail and suggest what could be done to avoid failure.

Traditional methods may fail as a result of:

1. A gap of understanding between users and developers leading to a failure to reconcile business needs and technological possibilities.
2. Developers may isolate themselves from users either through physical separation or through use of jargon and a failure to communicate.
3. Measuring quality in relation to the specification rather than comparing the systems capabilities with what it was required to do.
4. Long development times during which time business conditions and requirements may change.
5. Changing business needs may not be recognised once the specification has been agreed and the process of development has begun.
6. Users may not get what they want simply because they can not envisage how the system will look at the outset. By the time they have access to a working system it may be too late to effect any changes.

*1 mark for each valid point subject to a maximum of 5
Marks may be awarded for other relevant and well argued points*

Avoidance of failure

There are a number of points which can be raised here and could include:

- Ensuring a closer relationship between users and developers.
- Speeding up development times.
- Avoiding the use of jargon and using a common language of communication.
- Being responsive to changing business needs.
- Concentrating upon outcomes rather than specifications.

*½ mark for each issue addressed subject to a maximum of 2
Other valid points may be rewarded*

(7)

- (b) Explain what is meant by Rapid Applications Development, setting out the overall approach and explaining, in particular, what is involved at the prototyping stage.

Rapid Applications Development (RAD) is a method of developing information systems which uses prototyping to achieve user involvement and faster development times compared to the traditional and structured methodologies (Chaffey 2003,308).

1 mark for definition

The overall approach follows the systems development lifecycle but compresses the middle elements of it through the use of prototyping. The cycle becomes:

- Initiation.
- Prototyping.
- Final implementation.
- Maintenance.

2 marks for overview

Prototyping is the key element of RAD. The prototype is a preliminary version of the system or of part of the system which can be reviewed by end users. They have the opportunity to feedback on the prototype and participate in the development of the system. The process is an iterative one which leads eventually to the production of the final version of the system. (This may be explained by the use of a diagram.)

2 marks for explanation of prototyping

(5)

- (c) **What are the weaknesses of Rapid Applications Development?**

Weaknesses can include:

- Lack of methodology and documentation.
- Balance shifted too far in favour of users.
- Problem of consulting with all users and reconciling conflicting feedback.
- Tendency for approach to be too casual.

1 mark for each issue addressed subject to a maximum of 3
(3)

(15)

Question 5

This question relates to learning outcome B1 and objective 1.6 in the OLM.

This question should be answered in the form of an email and should be structured in line with the question requirements. There are no marks allocated directly for presentation.

- (a) Definitions of DSS (Decision Support Systems) and EIS (Executive Information Systems) and an explanation of the different roles that they fulfil.

Chaffey (2003) defines DSS as providing information and models in a form to facilitate tactical and strategic decision making involving semi-structured and unstructured decisions. They would incorporate performance data, business rules based upon decision tables, analytical tools and models and an easy to use graphical user interface.

1 mark for a basic definition plus 1 mark for more explanation as provided in the second sentence above
2

EIS are defined (*Chaffey, 2003*) as providing senior managers with a system to assist them in taking strategic and tactical decisions through the analysis, comparisons and highlighting of trends to help govern the strategic direction of the organisation. They are often integrated with operational systems allowing for managers to drill down to find more information on a specific problem.

1 mark for a basic definition plus 1 mark for more explanation as provided in the second sentence above
2

Whilst DSS and EIS do provide for different roles the distinction is not always totally clear and there is probably some overlap between the two terms. This is due to the way in which the systems have been developed and marketed. Points that can be made are:

- DSS may often be end user developed systems and departmental rather than corporate.
- DSS will support decision making at all management levels but will concentrate upon tactical and semi-structured decisions as required for the evaluation and planning of the business.
- EIS will be more concerned with strategic and unstructured decisions.
- EIS are more likely to be directly linked to operational systems as a source of data for analysis.
- EIS are more likely to be available to senior managers operating at a corporate level in the organisation.

*1 mark for each point subject to a maximum of 3 marks
Other relevant and correct definitions and points should be awarded marks*

(7)

- (b) An explanation of OLAP (Online Analytical Processing)/data warehousing which covers what it is, how it works and how it could be used, with examples as appropriate.

Definition of OLAP.

OLAP is Online Analytical Processing and refers to the ability to analyse in real time multidimensional information stored in data warehouses. *Chaffey (2003)* quotes Codd as defining it as the dynamic synthesis, analysis and consolidation of large volumes of multidimensional data.

1 mark for a good definition covering the above points

Data warehousing is defined by William Inmon (*Chaffey, 2003*) as “Subject oriented, integrated, time variant and non volatile collection of data in support of management’s decision making process”. Data warehouses are large data base systems containing large amounts of detailed data on the organisation’s performance. This information is taken from operational systems and transferred into a repository for decision making usually based upon a network system via a web based client or using specific software. The information may be analysed to identify problem areas, through slicing and dicing it using different dimensions. It can be used to spot trends which may be of use to the organisation. It can also be used for forecasting and developing what if scenarios.

1 mark for each relevant point subject to a maximum of 3

Examples.

In the private sector data warehouses have been developed to analyse sales and the best example is the use of data collected through store loyalty cards. The public sector organisation in the question is deliberately non specific but possible examples could involve the use of council tax data, data from clients of local authority or other organisational services etc.

2 marks are available either for two examples or for an example which is appropriate and well explained. Discretion should be used to reward creative thinking

(6)

- (c) A brief description of data mining and data marts.

Data mining is the identification of relationships between data variables through the use of statistical and analytical techniques, and may involve identifying associations and sequences and/or finding patterns and clusters in the data.

1 mark for a good definition

A data mart is a small scale data warehouse which might relate to one department of an organisation rather than the organisation as a whole.

1 mark for a good definition
(2)

(15)

Question 6

This question relates to learning outcomes A4 and E3 and objectives 9.4 and 19.2 in the OLM.

- (a) Calculate the correlation coefficient for the relationship between % of discount offered and the % take up by debtors and comment upon it.

x	y	x²	y²	xy
1.0	25	1.00	625	25.0
1.5	35	2.25	1225	52.5
2.5	55	6.25	3025	137.5
3.0	62	9.00	3844	186.0
3.5	75	12.25	5625	262.5
4.0	87	16.00	7569	348.0
15.5	339	46.75	21913	1011.5

2 marks for accurate table and correct totals

Correlation coefficient:

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

$$R = \frac{6,069 - 5,254.5}{\sqrt{(40.25 \times 16,557)}}$$

$$R = \frac{814.5}{816.34}$$

$$R = 0.9977$$

2 marks for calculation

The calculation produces a high correlation coefficient of 0.9977. The sample was quite small which means that the statistical significance may be questionable. The other point to note is that even a high degree of correlation does not mean that there is a causal relationship between the two variables.

*1 mark for comment
(5)*

- (b) Determine the relationship between the two variables using simple regression analysis and calculate the % take up which would result from offering a 2% discount.

Regression analysis.

Assumption is of a simple linear relationship which can be expressed as:

$$Y = a + bx$$

To find b

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

using the table above in (a)

$$b = \frac{6 \times 1011.5 - 15.5 \times 339}{6 \times 46.75 - 15.5^2}$$

$$b = 20.236$$

2

To find a

$$a = y - bx \quad (\text{mean of } y \text{ and } x)$$

$$a = 56.5 - 20.236 \times 2.583$$

$$a = 4.22$$

2

To find y

$$Y = 4.22 + 20.236x$$

Where x is 2

$$Y = 4.22 + 40.472$$

$$Y = 44.692$$

Y is approximately 45%

1

(5)

- (c) Calculate the financial effect of offering a 2% discount and comment upon your findings.

It would appear that a 2% discount would only provide for a 45% take up. This would be 45% of the debtors not currently paying within 30 days ie 45% of 80% = 36%.

1

There would now be (36 + 20) = 56% of debtors paying in 30 days and claiming discount. This is 56% of 60% of £4m and at a discount of 2% the discount given would be £26,880.

1

Savings assume that 36% of debtors who were paying in an average of 62 days are now paying in 30 days ie a saving of 32 days. The daily rate of interest being saved is 7/365 which is 0.019178 per day. The amount being paid earlier is 36% of 60% of £4m (less the discount of £26880). This comes to (864,000 – 26880) £837120. Interest savings on this amount are £5137.

An alternative calculation might ignore the effect of the discount allowed for those already paying earlier. This would give £864,000 - £17,280 = £846,720, and interest savings of £5,196. This should be accepted as being correct.

2

The use of discount is clearly not justified on the basis of the data used. It may be that the savings could be larger as debtors might pay before the 30 day period, hence saving more days and other figures used are estimated. The size of the difference make it unlikely that the cost of the discount would be covered.

1

(5)

(15)

Question 7

This question relates to learning outcomes C1 and C2 and objectives 15.1 and 15.5 in the OLM.

Answers should be in the form of a briefing note for the new County Treasurer. They should be appropriately addressed and headed and a formal style of writing should be used. The note should be sectionalised in accordance with the two sections of the question.

1 mark for presentation taken from the allocation for part (a)

- (a) An outline stakeholder analysis which identifies the main internal and external customers of the department and describes the types of support which they need and the nature of the financial information which they require.

The main internal customers would be:

- Departmental management.
- Departmental budget holders and spending officers.
- Committees/council/authority board – decision makers.
- Finance staff.
- Staff in other departments directly involved in finance.

External customers would include:

- Receivers of bills.
- Receivers of cheques.
- Funding bodies/partnerships etc.
- Council tax payers/service charge payers.
- Prospective tenderers for provision of services/suppliers.
- Service customers.
- Suppliers.

The first part of the answer should contain a listing of the main stakeholders.

½ mark for each stakeholder up to a maximum of 4

Answers should then relate the stakeholders to types of support. This could be done in the form of a checklist or matrix or may be in a narrative format.

Types of support roughly divides into transaction information and documentation and financial information and advice for operational, tactical and strategic decision making.

*2 marks for identification of main types of support plus
2 marks for relating this to the list of stakeholders*

4

Overall presentation referred to above 1

(9)

- (b) Suggestions for changing the charging base with an indication of the likely benefits and drawbacks of each approach.

The current approach is an overhead recovery basis which is regarded as being unsatisfactory. The main alternatives to be considered are:

Improved overhead recovery

This would involve changing the bases upon which charges were being made and relating them to the activities which give rise to the costs. This would involve analysing the basis of cost, identifying appropriate cost drivers and arranging for cost pools to be set up.

The benefits of this would be:

- More accuracy.
- Greater reliance on and confidence in costs.
- Improvement in accountability.
- Activity base increases understanding of costs and drivers.

Weaknesses:

- Still regarded as overhead recovery.
- In itself it does not form a contract and does not relate costs to performance.
- Could be time consuming.
- Problems of redistribution of charges.

1 mark for explanation plus ½ mark per benefit up to a maximum of 1 and ½ mark per weakness up to a maximum of 1

3

Use of Service Level Agreements/ trading Agreements

The finance department would enter into internal contracts with the users of financial services, which would identify the nature of the services to be provided, would accurately cost those services and would also determine a basis for judging performance. Failure to comply with the contract could give rise to penalties. SLAs could be taken to a further stage which would involve departments etc choosing the levels of financial support which they required and possibly looking at alternative suppliers ie the formation of an internal and/or external market for financial services.

Benefits would include:

- Much greater accountability.
- Incentives to efficiency and greater effectiveness of services.
- Better budgetary control by users through encouraged ownership.
- Greater understanding all round of the nature of the finance function and greater responsiveness by finance department.
- Equitable.
- Transparent.

Possible weaknesses include:

- Could be viewed as over bureaucratic and as a paper exercise.
- Redistribution of charges could cause problems in the short term.
- Might lead to reduction in finance capacity due to pulling in of demand for services.
- Internal markets could cause problems in the short to medium term.

*1 mark for explanation plus ½ mark per benefit up to a maximum of 1
and ½ mark per weakness up to a maximum of 1*

3

Marks may be awarded for other relevant approaches

(6)

(15)