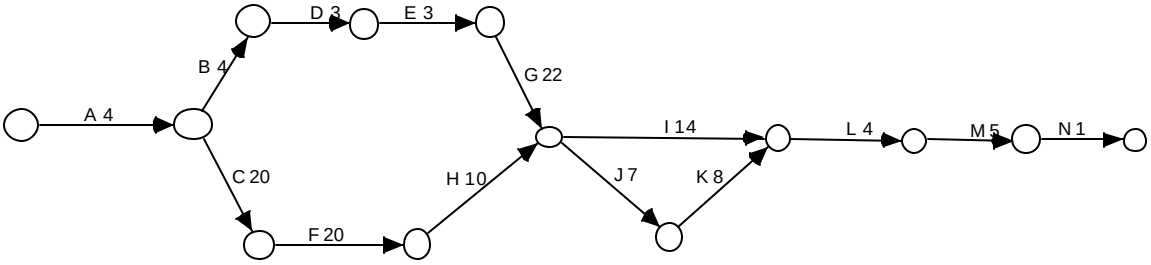
INFORMATION AND FINANCIAL MANAGEMENT

Professional 1 examination
December 2002

MARKING SCHEME

Question 1

(a)



4

(b) Activities on critical path are A-C-F-H-J-K-L-M-N *1*

Estimated elapsed duration is 79 weeks *1*

Cost of normal activities = £224,500 *1*

Up to a maximum of 3

(c) Based on the original estimates, the project is within budget by £5,500, but is outside the time constraint by four weeks.

A number of options exist:

1 Reduce activity H by 4 weeks at a cost of £1,500 per week. Activity H lies on the critical path so this is worthy of consideration. This option will bring the project within the original time constraint. The additional cost will be £6,000 (£1,500 × 4) but there would be a saving in variable cost of £5,000 (£1,250 × 4). So the net cost would be £1,000.

2 Reduce activities B, D or G by up to two weeks each at a cost of £3,000 per week. B, D and G do not lie on the critical path so reducing them will not affect the overall duration of the project.

3 Activity J may be reduced up to 3 weeks at a cost of £1,300 per week. As there is a saving of £1,000 this amounts to a net cost of £300 per week. After 1 week, however, activity I will become critical and this cannot be reduced. Activity J, therefore, will not achieve the required reduction and also happens to be more expensive to reduce than activity H.

This suggests that the most cost effective solution would be to reduce activity H by 4 weeks. This would bring the project duration down to the target of 75 weeks and would affect the budget as follows:

Original cost estimate	224,500
Add 4 week reduction of H	1,000
Revised cost estimate	225,500

Conclusion: the project can be completed on time and under budget if activity H is reduced by 4 weeks.

1 mark for appraisal of each of the 3 options
1 mark for conclusion, up to a maximum of 4

If the college goes ahead with the project, the project manager will have responsibility for controlling it to ensure that it meets its objectives. Two of these objectives are completion within 75 weeks and within budget.

The network diagram provides a basis for controlling the timing of the activities. It would be possible to prepare a Gantt chart showing the expected completion dates for each activity. The manager could use this to check that activities were being completed on time.

If an activity was over-running the manager could then look to see whether it was a critical activity. If it was then s/he would need to look for a way of reducing some other activity in order to bring the project back on target. If the delayed activity was not on the critical path then a delay would not be so serious. However, the manager would still need to find the cause and likely duration of the delay in order to ensure that it did not exceed the float available on that activity. It would be useful to calculate the amount of float available on each activity to assist with this process.

The manager would also need to put arrangements in place to ensure that the budget was not exceeded. S/he would need to obtain regular reports of the actual amounts spent, categorised in the same way that the original budget had been built up. Actual and budgeted costs could then be compared to identify any variances. The estimated cost of the project is below the budget available. However, action to reduce costs would be needed if significant adverse variances (overspends) were identified.

1 mark for each valid point made to a maximum of 4

(15)

Question 2

(a) The main advantage of a bespoke development is that the system is likely to match the organisation's requirements much more closely than an adapted one which was originally developed for another client.

Against this there are a number of significant disadvantages which suggest that adapting an existing system might be a better option:

- A bespoke system is likely to cost more.
- A bespoke system is likely to take longer to develop.
- An adapted system is already tried and tested to some extent and is therefore less likely to have "bugs".
- While a bespoke system should match the client's specification or requirements precisely, the adapted system may include some features which the client will find useful but had not thought of.

In deciding which approach to adopt Carrie should consider how closely the US system matches the requirements for the UK prison. If a large amount of work would be required then it might be simpler and/or cheaper to start from scratch.

1 mark for the advantage and ½ mark for each disadvantage to a maximum of 3
Up to1 mark for factor(s) to be considered
Credit given for other valid points
(4)

(b) The systems development life cycle consists of the following seven stages:

Initiation: this involves identifying the need for the system and ensuring that there is top level support and funding for it. Clearly this would be needed for both a bespoke development and an adaptation. *1*

Feasibility study: a study should be undertaken to establish that the proposed system is feasible (technically, financially and operationally). The result would be a recommendation whether to proceed. The feasibility study should help to decide between bespoke development and adaptation by considering the technical, financial and organisational implications of each. *1½*

Systems analysis: this involves understanding how any pre-existing systems work and then identifying the requirements for the new system. In the case of Carrie there will not be any pre-existing system as such, though it might be possible to examine systems in existing UK prisons. A clear statement of requirements is important regardless of whether a bespoke or adapted system is chosen; however, in the latter case requirements might be adjusted to some extent in the light of the capabilities of the system to be adapted. *1½*

System design: this involves establishing in detail how the system will work. For example, security standards, menu navigation and screen layout would be specified at the design stage. If an existing system is to be adapted then there will be much less work to be done at this stage, though there will still be a need to design the adaptations. *1*

System build: this stage involves creating the software to meet the design established at the previous stage. In the case of an adaptation the basic software already exists but the required adaptations would be made. Software must be tested as part of the build stage. *1*

Implementation and changeover: this is the stage at which the system actually goes live. It involves installing hardware and software, training users, writing procedure manuals, transferring or (in the case of a new system) creating data, going live with the new system and dealing with any initial problems which arise. *1½*

Maintenance and review: this stage continues for the life of the system. It involves correcting any problems which arise and adapting the system to meet changed or enlarged requirements (maintenance). It also involves reviewing the system from time to time to ensure it continues to meet requirements: eventually a time may come when it does not and a new system development project then needs to be initiated. *1½*

Clearly the two final stages will apply both with a bespoke system and an adaptation.

1 or 1½ marks for identifying and describing each stage (as shown above)
Up to a further 3 marks for comments on how stages differ
(12)

(c) SSADM is a formal methodology which sets out in detail the stages, steps and tasks required to analyse and design a new information system. It places great emphasis on a standardised and well documented approach and is therefore particularly useful for large scale systems where a large team of analysts and programmers is likely to be involved.

If Carrie decides on a bespoke development it may well use SSADM. The reason is that the project will be fairly large scale. It will also presumably involve the Prison Service since they will be the source and the recipient of much of the information it uses. It is UK government policy that large system projects should be developed using SSADM.

If adaptation is chosen there may be less need for a structured method, depending on the scale of the adaptations required.

SSADM only deals with stages 2 – 4 of the development process outlined in part (b) above.

Up to 3 marks for describing SSADM
1 mark for identifying the stages it applies to
(4)

(d) A prototype is a preliminary version of a part or all of a system which can be reviewed by users. It will show them the look and feel of the system as it will be when in use, without necessarily providing all the background data processing.

It is most commonly used as part of a "rapid application development" (RAD) approach to system development, rather than the more structured approaches described in parts (b) and (c) above.

It often involves an iterative process, with users commenting on a series of prototypes, each one building on the previous comments.

In the case of Carrie's system, prototyping is less likely to have a place if a bespoke development is adopted, though there may still be scope to use the technique during the design stage.

It may be more appropriate if it is decided to adapt the US system. This will depend to what extent the adaptations affect how the system interacts with users.

Up to 3 marks for description of prototyping
Up to 2 marks for application to Carrie's project
(5)

(25)

Question 3

MEMORANDUM

To: Director of Finance, Artemis NHS Trust

From: CIPFA Trainee

Date: December 2002

Subject: Executive Information Systems

Presentation 1 mark

(a) An executive information system (EIS) is designed to provide senior managers with a system to assist them in taking strategic and tactical decisions. Its purpose is to analyse, compare and highlight trends to help them govern the strategic direction of a company. EISs are commonly integrated with operational systems, giving managers the facility to drill down to find out further information on a problem.

Bocij et al. (1999: 219).

½ mark for each point made, up to a maximum of 2

An intranet is a private network that uses the standards, tools and protocols of the Internet. It provides an easy way of connecting key people in organisations with the information they need

Bocij et al. (1999: 621).

Intranets provide a cross-platform medium for delivering applications such as an EIS. Intranets also provide other types of information. These might include:

- Staff phone directories
- Staff procedures or quality manuals
- Staff bulletins and newsletters

½ mark for each point made, up to a maximum of 2

(5)

(b) (i) In feedback closed-loop control systems, the control loop compares the output of the process to the desired output and corrective action is taken if a deviation occurs.

½ mark for each point made, up to a maximum of 1

In feedforward controls, the environment and system process are monitored in order to provide corrective action if it is likely the system goal will not be met.

½ mark for each point made, up to a maximum of 1

Feedback controls

- Use data to reverse adverse trends.
- Use historic information.
- Generally cannot take account of events external to the system.
- Often cannot change quickly.

½ mark for each point made, up to a maximum of 2

Feedforward controls

- Use data to reverse adverse trends and continue or improve on favourable trends.
- Use current information.
- Can use information external to the system.
- Can be changed relatively quickly.
- Rely on predictive information.

½ mark for each point made, up to a maximum of 2

OLM (1.2 – 1.8)

(6)

(ii) EISs facilitate the implementation of feedforward controls as the user does not need to wait until the end of the reporting period to identify trends. The trend data obtained can then be used as the predictor input to a feedforward system.

1 mark for each relevant point made, up to a maximum of 2

(iii) EISs typically provide information at a strategic or tactical level, allowing divisional or unit managers to make decisions at a strategic or tactical level. The facilities of an EIS require integration with operational data, often stored in enterprise resource planning systems. The range of functions included in an EIS might include:

- Financial reporting.
- Management reporting.
- Total Quality Management reporting.
- Profit management.
- Enterprise budgeting.

OLM (6.5)
Bocij et al. (1999: 219-227)

Other reasonable answers accepted
1 mark for each relevant point, up to a maximum of 2
(15)

Question 4

(a) A performance measure can be used where there is a clear and demonstrable relationship between an activity and an outcome, that is between inputs and outputs. An example could be the financial return on an activity where one of the objects of the activity is to make a surplus or profit.

½ mark for definition, ½ mark for example

A performance indicator is an indirect measure of performance which provides the best evidence available on performance where the relationship between an activity and results is ambiguous. An example could be waiting times in the NHS.

½ mark for definition, ½ mark for example

(2)

(b) **Either**

Value For Money (VFM) in public service organisations (PSOs) focuses on the concepts of economy, efficiency and effectiveness. Economy refers to the minimisation of costs, whilst maintaining a threshold quality. Efficiency concerns the relationship between inputs and outputs. Effectiveness is generally taken to be the degree to which objectives are met and refers to both quality and outcomes.

OLM (10.7)

3 marks for definition of VFM, plus 1 mark for example

Or

Best Value [1] is particularly relevant to local government and is being extended to other PSOs. Performance measurement and performance indicators are inextricably linked with Best Value. The main features of Best Value are:

- The imposition of duties on all local authorities to demonstrate Best Value and consult with local taxpayers, service users and businesses.
- The adoption of a rigorous performance measurement framework linking clearly stated corporate objectives to service delivery.
- The creation, publication and implementation of performance plans.
- The retention of a national basket of performance indicators, against which individual authorities are measured on a continuous basis.

[1] Different arrangements exist in Northern Ireland, Scotland and Wales. Candidates may answer in relation to their local arrangements or refer to the English system.

For example, consider a refuse collection service. Initially, the authority will consider why and how the service is provided. It will then compare the existing service with that of other providers. It will then consult with users including individuals and businesses to ascertain their needs. This might involve more frequent collections and street cleaning. The authority will then consider how it could introduce competition if practicable, as a means of securing an efficient and effective service. In turn this would be related to corporate objectives and the development of specific performance plans for service delivery. Performance targets for the refuse service could be compared with a national benchmark.

OLM (14.4-14.7)
Other reasonable answers accepted
3 marks for description of Best Value in performance measurement context
1 mark for example

Identifying and applying appropriate measures is vital to determine whether VFM or best value is achieved or not. This is perhaps even more important in the public sector where there is the requirement for accountability and public funds are a scarce resource. PSOs which seek to achieve VFM or best value will sometimes need to trade off different factors. For example, a social services department increasing its social worker to client ratio will do so at the expense of economy. Perverse incentives also arise from the inappropriate use of performance measures and indicators.

Other reasonable answers accepted, 3
(7)

(c) Centralisation is the traditional approach. It will involve collecting all of the finance functions together in one central department of the organisation and provides a comprehensive finance service for the whole organisation. Work is concentrated hopefully leading to economies of scale.

1 mark for description and 1 for benefit

The main reasons for change away from centralisation reflects changes in the public sector environment. These include:

- A move towards more commercial practices and the threat of compulsory competitive tendering and market testing.
- A need to achieve and demonstrate greater efficiency and effectiveness in respect of all support functions including finance.
- A general movement towards devolution and delegation within internal management structures which encourage wider accountability and a focus on shifting decision making away from the centre.
- The growth in independence in organisations such as schools, colleges and universities has turned the finance function into a more strategic, creative and entrepreneurial role.

- A need to see users of public services as customers and the development of service quality management approaches to public services.
- Technology has had a major effect on allowing the distribution of processing and information provision.

OLM (9.5-9.7)

Other reasonable answers accepted
1 mark for each point made, with sufficient explanation
Up to a maximum of 3

Other financial structures might include:

Delegation of functions. This represents a first step away from centralisation. Functions are delegated to other departments but control of the functions remains with the finance department. Typically, a member of the finance department might be outposted to a service department on a secondment basis. However, this can cause conflict, through issues of divided loyalties, suspicion of being a finance department plant or the finance department having a perception of their staff 'going native'.

Devolution. This is a step further than delegation. Finance personnel are employed in the service department which then takes responsibility for financial functions. A potential conflict then comes from conflicting financial advice from inside and outside the department. Technology along with mechanisms such as trading and service level agreements have been drivers for change.

Outsourcing. This occurs when part or all of the finance function is provided by an external organisation. This is facilitated by voluntary competitive tendering or some other form of market testing. Typically, an organisation will identify core and peripheral finance functions. A range of issues are associated with outsourcing. These include: compliance with statutory regulations, implications for financial control, the relationship between the outsourced finance department and the remaining internal finance department.

(OLM: 9.4 - 9.6)

Other reasonable answers accepted
Up to 3 marks each for two alternatives,
but with a maximum of 1 for an alternative not appraised
(11)

(20)

Question 5

(a) $C = \sqrt{\frac{2bt}{i}}$

Merlin

$C = \sqrt{\frac{2 * 20 * 300{,}000}{.06}}$

C = 14,142 *1*

Optimum number of cash withdrawals = $\frac{300{,}000}{14{,}142}$

Optimum number of cash withdrawals = 21.21 *½*

Total investment costs = 21.21 x 20

Total investment costs = £424 *½*

Notional cost of holding cash = $\frac{14{,}142}{2}$ x 0.06

Notional cost of holding cash = £424 *½*

Total cost = £848 *½*

An answer based on 21 or 22 cash withdrawals is acceptable (Total = £844 or £864).

The Baumol model takes a similar approach to an inventory management model (ie economic order quantity). The aim is to determine the cash inflow which would minimise the total cost of holding funds. It makes a number of assumptions:

- Cash flows are certain and constant
- Outflows are made in advance of inflows and are continuous
- Inflows are regular and periodic

1 mark for each point made, up to a maximum of 2

(5)

(b) Calculate daily opportunity cost of holding cash

$K = \sqrt[365]{(1+R)} - 1$

Merlin

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

$\underline{K = 0.000160}$

$Z = \sqrt[3]{\frac{3Fs^2}{4K}}$ (Target balance)

$H = 3Z - 2L$ (Higher balance limit)

$W = \frac{4Z - L}{3}$ (Average balance)

$Z = \sqrt[3]{\frac{3*20*100}{4*.00016}} + 0$

$\underline{Z = £211}$

$H = 3 * 211 - 0$

$\underline{H = £633}$

$W = \frac{4*211-0}{3}$

$\underline{W = £281}$

1 mark for calculating daily opportunity cost of holding cash (K)
2 marks for calculation of Z
1 mark each for calculation of H and W

The Miller-Orr model recognises the relatively random changes in cash flow which occur in many organisations. It provides a calculation of a target balance (Z) and a higher limit balance (H). It assumes that the organisation has decided what the lowest acceptable cash balance (L) would be: in the case of Merlin this has been set at £0.

The results of the model could be used by Merlin as follows. Cash flows would be reviewed each day. Whenever the balance fell to or below the lower limit (£0) cash would be withdrawn from investments to bring the balance back up to the target level (£211). Whenever the balance reached or exceed the higher limit (£633) cash would be transferred into investments in order to bring the balance back to the target level.

Up to 1 mark for each point made to a maximum of 3

(8)

(c) The Baumol model is limited because:

- The steady state limitation is unrealistic for many organisations as it is difficult to predict with certainty the amounts required over future periods.
- The model is inapplicable to situations where funding is provided through an overdraft.
- There may be costs associated with running out of cash (both monetary and qualitative).
- The model does not work when there are exceptionally large or small inflows or outflows of cash from time to time.
- There may be costs of holding cash that rise with the average amount being held.

(OLM: 19.7-19.8)

½ mark for each point made, up to a maximum of 2

The Miller-Orr model attempts to introduce a greater element of realism by incorporating two additional assumptions:

- Net cash flows occur in a random pattern.
- Transfers can take place at any time and are instantaneous with a fixed transfer cost.

The model extends the basic inventory control model by incorporating certain control limits. These include a lower limit (set by management) and an upper limit, which is determined by the model along with the target balance and average cash balance.

Critics of the Miller-Orr model suggest that modelling techniques are too prescriptive and are reliant on questionable assumptions. However, some evidence exists to suggest that the Miller-Orr model provides better solutions than a simple intuitive method.

(OLM: 19.9)

1 mark for each point made
Up to a maximum of 4

It is likely the Baumol model will be most appropriate for Merlin. This reflects its simple pattern of regular and relatively even cash inflows and outflows.

Up to 1 mark for each valid point up to a maximum of 2

(8)

(d) However, it is likely the Miller-Orr model will be more useful in the case of CITOL as its cash flows appear in a more random fashion and include occasional large capital transactions. The Baumol model is likely to be overly simplistic for CITOL. Also, CITOL makes regular use of its overdraft facility which makes the Baumol model inappropriate.

CITOL will need to produce regular, updated cash budgets throughout the year and the cash position should be mentioned frequently in order that appropriate action is taken.

Up to 1mark for each valid point made up to a maximum of 4

(25)