THE BCS PROFESSIONAL EXAMINATION
Diploma

April 2001

EXAMINERS' REPORT

Project Management

On this occasion there were a few exceptionally good candidates who scored very highly.

Sadly however the overall results are very disappointing, many candidates were totally unprepared. Many provided answers in whole or in part that had nothing to do with the question as set. Clearly such answers, some running to two or three pages scored few marks. Such candidates are strongly advised to ensure that they are able to cover the whole syllabus and have time to review the past papers available on the BCS web pages prior to sitting the examination.

QUESTION ONE

A software house needs to change its current unstructured approach to project management. Produce a report to the Managing Director of the software house which explains, with supporting examples, of each of the following techniques.

The report should discuss any potential benefits and/or drawbacks of applying each technique.

a) Work Breakdown Structures **(5 marks)**

b) Network Analysis and Critical Path Analysis **(15 marks)**

c) Resource Smoothing **(5 marks)**

Generally, this was a popular and well answered question: some 86% of candidates selected this question and of those 65% passed.

Most candidates managed to provide some indication of what Network Analysis and Critical Path Analysis are, giving suitable examples of a Network Diagram (which included dummy and parallel activities). Some candidates gave examples that were too simplistic; thereby not illustrating how nodes should be described and/or how dependent activities should be modelled and/or how slack should be highlighted.

Overall, the descriptions of WBS and Resource Smoothing were not as well done as those for Network Analysis & Critical Path Analysis. Some candidates gave answers to part a) that were more like program breakdowns rather than work breakdowns. Part c) highlighted a lack of understanding of resource smoothing on the part of several candidates, with several even failing to attempt the question.

Answer Pointers

For this question, candidates were expected to provide a good description of each of three Project Management (PM) techniques (i.e., Work Breakdown Structures (WBS), Network Analysis & Critical Path Analysis, and Resource Smoothing), together with any benefits and/or drawbacks. Examples (typically in diagrammatic form) were expected as part of the description. Some of the following points could have been made.

a) Work breakdown structures:

1. Decomposing a project into chunks of work at different levels of abstraction.

2. Assigning time, labour and material requirements to the work chunks at the lowest level.

3. WBS results in a good idea about how much, who involved etc., but need to use network/critical path analysis to gauge overall duration of project, dependencies and critical activities i.e., limited use of this technique. More accurate, less chance of error.

b) Network Analysis & Critical Path Analysis:

1. Involves drawing up a network diagram based on activity information (e.g., activity on arrow diagram) and using this to find the critical path of activities – those that must occur on time in order for the project to remain on time (i.e., slack time of each activity on the critical path is zero).

2. Network diagram enables the overall project duration to be calculated accurately.

3. Parallel and sequential activities can be modeled, via the use of dummy nodes.

4. Can lead to a more informed plan, knowing what the critical activities are, knowing where the slack in the project is, and having the ability to perform sensitivity analysis (particularly easy when using supporting Project Management (PM) software).

5. Forms the input to resource smoothing activity via the Gantt chart.

c) Resource Smoothing:

1. Involves working out a resource histogram, which identifies how much of the resources (labour) are needed to perform the project activities during each project period (e.g., one day or one week depending on what was used as the unit of project duration).

2. The histogram shows where there are peaks and troughs in resource usage. From the Gantt chart, which shows slack, it may be possible to start certain activities later so that resources requirements are smoother over the total project duration. Obviously, only those activities not on the critical path can be moved, as the former have no slack.

3. Business benefits include: less up and down resource requirements and the problems therein, and if changes are needed during the project then they can be analysed using this method more effectively than in an ad-hoc manner.

Marks Breakdown

a) Examples and description	(3 marks)
Benefits	(2 marks)
b) Examples and description	(10 marks)
Business benefits	(5 marks)
c) Examples and description	(3 marks)
Benefits	(2 marks)

QUESTION TWO

a) You are an IT manager responsible for selecting a project manager for an MIS development project. Describe the principal skills and qualities you would expect the project manager to possess. (15 marks)

b) Using examples based on project management software known to you, explain how project management software might aid the financial management of a project. (10 marks)

This question was also popular, selected by 82% but passed by less than half, and was not in general as well answered as Question 1.

This part was done very well by those candidates that did indeed describe several qualities and skills to a good level of depth. However, other candidates provided a list of qualities and skills, without any **discussion** (as required by the question) or any explanation as to why they were useful to possess, and, in some cases, as to what they actually mean. For example, some candidates listed leadership skills, without saying what this means in practice. Others listed communication skills, without explanation as to why they are needed and as to what particular communication skills they are referring (e.g., writing, speaking).

Answer Pointers

a) This was not dissimilar to a question set on the specimen paper for this subject. It required the candidate to describe the qualities and skills you would expect a project manager to possess, within the context of MIS development. Some qualities/skills that could have been discussed include the following:

1. The ability to lead a project, to select an effective project team and to allocate work.

2. The ability to think logically, and to analyse and interpret information.

3. People-oriented so that any problems can be identified and overcome effectively.

4. Has experience/skills in MIS developments, problems that may be encountered, etc., and possibly in the development environment itself.

5. The ability to communicate effectively, in both written and verbal forms, with all levels of personnel, but particularly management users, as this is an MIS development.

6. Skills in utilising project management techniques and software tools.

7. The ability to inspire and encourage staff.

b) This part related to how PM software can aid project financial management (i.e., planning and control). Candidates needed to relate their answer to particular PM software that was familiar to them (e.g., Superproject, Microsoft Project).

This part was well answered by those candidates who were able to relate their answers specifically to their own PM experiences and software utilisation. Project financial control issues were better described in the main than project financial planning issues. Some candidates failed to grasp what was required by the question, providing an answer relating to general financial management issues rather than project- or PM software-related.

Issues that candidates may have considered included the following:

1. The ability of the software to calculate the total labour and material requirements for a given project, given the Gantt chart, and hence the financial requirements of the project, and what is required when (i.e., regarding cashflow). It may also have the ability to relate the resultant financial implications to the allocated budget.

2. Sensitivity analysis enables some contingency planning of finances to be considered.

3. The use of the software (e.g., reporting capabilities) may provide the platform for discussions regarding finances and their availability.

4. When the project deviates from that expected, the financial implications could be assessed quickly and easily. The software may be able to plot differences between actual and expected finances required in the form of a suitable report.

Examples using software known to the candidate should have been used to illustrate points made.

Marks Breakdown

a) Description of qualities/skills and discussion	(Up to 15 marks)
b) Explanation of PM software and project financial planning with examples	(5 marks)
Explanation of PM software and project financial monitoring and control with examples	(5 marks)

QUESTION THREE

A division of a large organisation has been split off to form a separate company. The new company requires its own financial accounting system and a decision has been taken to obtain a suitable 'off-the-shelf' package.

a) Outline the sequence of activities that would be needed in a project which evaluates, selects and acquires the financial accounting software from an external vendor (12 marks)

b) Explain the activities needed to make the selected package operational (13 marks)

Just under half the candidates attempted this question, of those 62% passed.
Candidates were asked in part a) to outline the sequence of activities that would be needed on a project that evaluates, selects and acquires a financial accounting package.

In part a) a common fault was to list selection criteria rather than the required *sequence of activities*. Another was to describe activities that were either 'upstream' or 'downstream' from the activities of evaluation, selection and acquisition. The question asked for a *sequence* of activities, so some structure in the activities was sought by the examiner, but was often not found.

In part b) candidates tended to be patchy in the identification of possible activities. Data take-on was surprisingly neglected. Strictly speaking maintenance and post implementation reviews, while worthy activities, were outside the scope of the question.

Answer Pointers

a) Activities could have included:

1. Definition of terms of reference

2. Requirements gathering and documentation:
   functional requirements
   non-functional (e.g. quality) requirements

3. Definition of selection criteria and methods of evaluation

4. Identification of potential suppliers and packages

5. Evaluation of candidate packages - methods could involve:
   site visits to existing users
   demonstrations
   trials of software in-house

6. Elimination of packages that do not pass 'must have' criteria

7. Method of scoring desirable features

8. Risk analysis of remaining candidate packages e.g. likelihood of continued trading of vendor

9. Contract negotiation

10. Order

b) This part asked for the activities needed to make the acquired software operational.
The activities might have included:

1. Acquisition of the hardware/software platforms upon which the accounting application is to run

2. Acceptance testing

3. Training of staff

4. Writing of office procedures to complement computer-based processing

5. Setting up of the account structure and data take-on

6. Possible parallel running

Marks Breakdown

a) Each valid activity (1 mark)
(note, important omissions were penalised)

b) Valid explanation (1 mark)
Each valid activity (1 mark up to a maximum of 13)

QUESTION FOUR

A project involves the design, coding and testing of software. There are six software developers who report to the project leader who in turn reports to a project board (or steering committee). This board includes representatives of the IT and user management of the organisation in which the software will ultimately be deployed.

a) Identify the information the project team leader would need from the software developers in order to monitor and control the successful execution of the project and specify how the project team leader would obtain the information. (8 marks)

b) Outline the content that a monthly report to the project board by the project team leader should include. (8 marks)

c) Outline the actions which could be considered if it were found that the actual progress of the project was at variance with what was planned and that it was unlikely that the project could be brought back in line with the plan. (9 marks)

Half the candidates attempted this question and of those sadly only 49% were able to provide sufficient information to obtain a pass.

In part (a) candidates were asked for the information a team leader would need from their team in order *to monitor and control* a project.

Candidates were also asked to specify how this information could be collected. Some missed this requirement and thus were unable to attract the 4 marks allocated. (Read the question !) Some candidates included other types of information that were not needed for monitoring and control - for example, details of which developer was developing which software component should have been settled during the planning phase.

A common fault in part b) was to show no awareness of the need to avoid ‘information overload’ when reporting upwards. Thus some candidates erroneously included every detail they could think of, for example individual change requests.

Answer Pointers

a) Answers were expected to include:

1. details of work completed, work started, work continuing in the current reporting period
2. projections of the time needed to complete outstanding tasks
3. actual effort expended on activities
4. details of externally imposed problems

The main information could be collected by:

1. team meetings
2. time sheets
3. other sources: error reports, configuration management system etc.

b) This asked for an outline of a monthly report to a project board on project progress.

Among the items that could have been mentioned were:

1. Achievements in the reporting period
   scheduled tasks completed
   scheduled tasks begun
2. Tasks that should have been completed, but have not been
3. Tasks that should have been started, but have not been
4. Costs incurred versus budget costs
5. Note that much of the information above could be displayed in graphical format e.g. Gantt charts for task progress and accumulative bar-chart of expenditure over time for costs
6. Outlook - any problems on the horizon, likelihood that slippages can be made good etc
7. Risk update
8. Recommendations to project board

c) This part sought the corrective actions that could be considered if a project was deviating from its plan:

Actions to be considered could have included:

1. Extending the completion date

2. Cancelling the project if costs would now exceed benefits

3. Adding more resources (by overtime, agency staff etc.)

4. Re-deploying staff from activities that were ahead of schedule to those that were behind
5. Reducing the scope of the project

6. Curtailing quality requirements e.g. testing

7. Applying an incremental approach, so that important features were implemented quickly while less urgent features were delayed

8. In most cases above, a new exception plan would be needed

Marks Breakdown

a) Examples of monitoring and control (Up to 4 marks)
Examples of collection of information (Up to 4 marks)

b) Examples of items in monthly report (Up to 8 marks)

c) Examples of corrective actions (Up to 9 marks)

There were many good points made by candidates, but to obtain good marks candidates were expected to go beyond simply saying 'investigate causes'.

QUESTION FIVE

a) Identify FOUR generic risks that can threaten the success of a software development project. (8 marks)

b) Explain how the relative seriousness of a risk, and the cost-effectiveness of particular activities that might reduce the risk, can be measured. (9 marks)

c) Explain the difference between risk avoidance and contingency actions, illustrating your answer by suggesting possible risk avoidance and contingency actions for TWO of the risks identified in a) above. (8 marks)

The third most popular, with 76% of candidates selecting this question, however only 56% managed to reach a pass standard.
This question in general covered areas of risk.

While candidates could rely to a certain extent on ‘common sense’ for part (a) and (c), this part required a familiarity with the material on risk analysis which many candidates clearly did not have.

The examiner became aware when looking at some of the examples provided that the difference between risk reduction and contingency activities is not always clear-cut, e.g. taking back-ups to allow recovery of systems if they should crash.

Answer Pointers

a) Here candidates were asked to identify four generic risks that could threaten the success of a software project.

The risks that could have been mentioned included:

1. Personnel short-falls - e.g. staff not as productive as planned; staff withdrawn from projects to other tasks.

2. Scope creep - additional requirements or functions being added without additional time being allowed to implement them.

3. Incorrect estimates of effort .

4. Users uncertain of their requirements.

5. Requirements known, but changes in the environment (e.g. statutory changes) change requirements as originally specified.

6. Withdrawal of support for tools used.

To obtain 2 marks for each risk identified, candidates need to identify the situation that causes the risk and the nature of the damage that the situation could cause. For example, ‘inexperienced staff’ by themselves are not a risk, but the fact that they might make mistakes in inputting data into a system is a risk. Similarly, ‘deadline not met’ identifies the damage, but not the cause.

The examiner was also looking specifically for project risks rather than business risks. Many candidates devoted all their attention to security issues, which have more bearing on the operational system than on the ***development project.***

b) Here, methods of measuring the seriousness of a risk and the cost-effectiveness of risk reduction activities were sought.

A common way of measuring the magnitude of risk is by assessing risk exposure (RE) which is the probability that the risk might occur (>0.00 and <1.00) multiplied by the cost of the damage if it does occur. Other approaches where exposure and damage were categorised as ‘high’, ‘medium’ or ‘low’ were acceptable.

The cost effectiveness of a risk reduction activity can be measured by costing the activity and comparing it with the reduction of risk exposure that the activity would bring about.

c) Here examples of risk reduction and contingency activities were required.

Marks Breakdown

a) Each valid risk	(2 marks)
b) Explanation of Risk Exposure	(4 marks)
Explanation of activity costing	(Up to 5 marks)
c) Defining the difference	(2 marks)
Identifying a risk reduction activity	(2 marks)
A contingency activity	(1 mark)

(Given two examples, this added up to 6 marks)

QUESTION SIX

You are the newly appointed IT Manager of a manufacturing company.

a) A project team is needed to develop a new order processing and distribution system. Discuss the principal issues that you would take into account when setting up this team. (15 marks)

b) The development project mentioned in *a)* has started, but several members of the project team are under-performing.

By relating your answer to an appropriate theory of motivation, explain why this underperformance may be occurring. State any assumptions you make about the manufacturing company, and its operation, within your answer. (10 marks)

This question was attempted by just 62% of candidates, and unfortunately was not well done by many. This is reflected in the very disappointing pass rate of less than 30%.

There were some very good answers to this question, scoring a near maximum mark, but these were rarely found. This was because many candidates mentioned several issues but did not describe them or give reasons for their inclusion. For example, several mentioned staff inter-relationships, yet failed to provide sufficient description for the examiner to give more than basic marks.

Overall, part b) of the question was answered poorly, as many candidates failed to even mention a motivation theory (thereby losing half the available marks). Instead, they provided a seemingly random list of reasons why under-performance was occurring. Some attempted a theory, but did not remember the detail required for good marks. Some provided an overview of several theories, which was not required by the question. In this case, the best theory description was taken as the answer and marked accordingly.

Answer Pointers

a) This part was concerned with the issues that needed to be considered when selecting a project team with respect to a given organisational situation, i.e., the development of a new order processing and distribution system. Issues that could have been considered include the following:

1. Decide on the skills the project requires and relate these to the skills available in-house. Problems of not having the skills in-house – contract in the skills? Pairing of experienced staff with junior or trainees.

2. What experiences the possible team members have of the order and distribution side of the company.

3. Staff inter-relationships – are there some staff you would not have working together on the same project?

4. Rotation of staff to ensure job enrichment.

5. Identify the person who is to lead the project

b) This part required candidates to consider a suitable motivation theory, such as Herzberg's Hygiene/Motivation Theory or Maslow's Hierarchy of Needs, and relate this to the under-performing of staff, e.g. for Maslow:

1. Basic physical needs such as warmth, food, etc. (is the work environment not conducive to work?)

2. Security needs (is the work environment providing the security and stability requirements that staff need?)

3. Social needs (is the project working as a group. Are the employees that are under-performing able to interact with others as they might like?)

4. Social recognition needs - are the employees in question respected by their co-workers, and are the jobs they are performing worthy of their abilities?

5. Self-fulfillment needs – are the jobs they have been allocated giving them the opportunity to develop and achieve their full potential?

Marks Breakdown

a) Discussion of project team selection issues	(Up to 15 marks)
b) Overview of motivation theory selected	(5 marks)
Application of the theory to the given situation	(5 marks)