

**THE BCS PROFESSIONAL EXAMINATIONS**  
**BCS Level 5 Diploma in IT**

**April 2008**

**EXAMINERS' REPORT**

**IT Project Management**

<b>Question</b>	<b>Syllabus</b>
1(a)	6a Use of requirements elicitation, etc
1(b)	6a Stages of a project
1(c)	6a Project closure
2	6b estimating techniques
3	6b Project planning; A-on-N networks; CPA; resource allocation; Gantt charts
4(a)	6c Project organisation
4(b), (c)	6d types of report
5(a), (b)	6a. Business case; areas of risk
5(c)	6d Monitoring
6.	6d Quality control & assurance

**Question 1**

- a) Describe the FIVE main areas of activity that the project manager must undertake between the start of project and work starting on the technical deliverables. **(10 marks)**
- b) Identify FIVE key types of activity undertaken by the project manager during execution of a project, giving an example activity for each type. **(5 marks)**
- c) Describe the FIVE main areas of activity that the project manager must carry out after the technical deliverables have 'gone live' but before the project is formally closed down. **(10 marks)**

**Part (a) Answer Pointers**

Rationale - carry out feasibility study, prepare business case, conduct cost benefit analysis  
Scope - set boundary, agree exclusions, estimate cost, agree quality expectations  
Schedule - plans for project or stage, key milestones, external dependencies  
Resources - assemble the team, identify need for user or contractor resources, agree time required from management for project  
Method - agree roles and responsibilities, reporting, create logs for risk/change/issues etc

**Part (a): Examiners' Comments**

The question asked for five main areas rather than individual activities. High marks went to candidates who demonstrated a breadth to their knowledge rather than listing a number of activities in just one area. For example listing 10 activities under the general heading of scheduling would not attract marks but 10 activities drawn from all five main areas would attract marks. The most neglected area was Rationale while candidates offered up numerous activities under Schedule.

### **Part (b) Answer Pointers**

Planning - for next stage, (also review existing stage )

Monitoring - variations to plan, (also agreed changes)

Taking Action - to resolve problems, (also to correct variations)

Reviewing Actions - evaluate success of action, ( also revisit alternatives, is the problem fixed)

Motivating - team, (also users, self )

### **Part (b): Examiners' Comments**

This question was generally answered well but again it asked for consideration of the main activities. Marks were awarded where detailed activities were used as examples.

### **Part (c) Answer Pointers**

Business - plan to realise benefits, close down budget,

Deliverables - handover test plans, documentation, quality reports

Plan - review actuals v. estimates, identify delayed activities and causes,

People - team dispersal, celebrate, carry out appraisals

Way of working - lessons learned, arrange a post project review, hold final management meeting to sign off

### **Part (c): Examiners' Comments**

Though many candidates managed to score high marks in this area some did not even attempt this third part of the question and others focused on technical activities such as testing or documenting. High marks went to candidates who focused on project management activities and who considered the breadth of work contained within the closedown stage.

## **Question 2**

- a) Explain the difference between top-down and bottom-up estimating. **(8 marks)**
- b) i) Describe briefly COCOMO. **(6 marks)**
- ii) Identify SIX productivity drivers for software development. These may or may not be associated with COCOMO. **(6 marks)**
- c) Describe the Delphi technique and why it might be useful in estimating. **(5 marks)**

### **Part (a) Answer Pointers**

#### **Top down**

-Purpose is to produce a ball-park or general estimate or can be used when a quick estimate is needed. This may be used to initiate a feasibility study or decide to flesh-out the estimate.

-Based on a comparison with similar existing projects or past projects ( parametric).

-The idea of 'similarity' rests on a number of variables which need to be identified.

-May differ significantly from final actuals or even a bottom-up estimate

( no consideration of resources )

-Without low level components/activities to assign resource to it will not be possible to identify the project's resource needs.

**Bottom up**

- Purpose is to establish both cost and duration. So should be used when accurate estimates are needed.
- Though it is called Bottom up you start by breaking down the project into smaller components.
- The cost and effort of each of the smaller components is estimated on its own merit ie in isolation. This will require work to be done at a detailed level.
- These individual estimates are aggregated into a total for the project. This will require a structure such as PBS or WBS to ensure there are no omissions or duplications in the summing up.
- ( the sum of the durations does not take into account any resource issues )
- Resources and levelling must be applied to get an authentic duration

**Part (a): Examiners' Comments**

Many candidates scored well on this question but some confused the two approaches.

**Part (b) Answer Pointers**

These are the productivity drivers associated with CoCoMO

Development flexibility

Development mode

Team cohesion

Degree to which developed for reuse

Precedentedness (has it been done before)

Architecture and risk resolution

Platform experience

Database size

Required development schedule

Language and tools experience

Language experience

Process maturity

Modern programming practices

Storage constraints

Platform volatility

Use of software tools

Applications experience

Personnel continuity

Documentation match to lifecycle needs

Multisite development

Turnaround time

Required software reliability

Time constraints

Product complexity

Personnel/team capability ( Boehm, 2000, IEEE Software, 17-5,pp 14-17)

**Part (b): Examiners' Comments**

This two part question had mixed responses. On the whole the first part, saying what CoCoMo was, was answered well, often drawing on the history of the method as well as provision of some of the key calculations involved. Candidates who offered some form of amplification around the equations rather than just listing them scored well. An answer that described CoCoMo without equations scored better than a list of equations without explanation. However, candidates found it difficult to articulate the drivers which affect productivity.

### Part (c) Answer Pointers

Involves a number of individual opinions  
Is anonymous  
Requires expertise/knowledge to be effective  
Gives an aggregate  
Is considered more reliable than an individual opinion

### Part (c): Examiners' Comments

Candidates answered this question well but the most overlooked element of this particular method was the fact that contributions are anonymous.

### Question 3

A small IT department has been asked to set up an online enquiry database system. The IT manager (who will act as project manager) has drawn up an initial plan of the work involved:

	Activity	Weeks
A	elicit requirements from the intended users, and draw up a specification	3
B	design the underlying database	2
C	build and test the input and data validation software	7
D	build and test the enquiry software	5
E	build and test the reports software	4
F	integration testing	2
G	write the user manuals	3
H	system testing by the end users	2

Task B must follow A

Tasks C, D and E can run concurrently, but must follow B

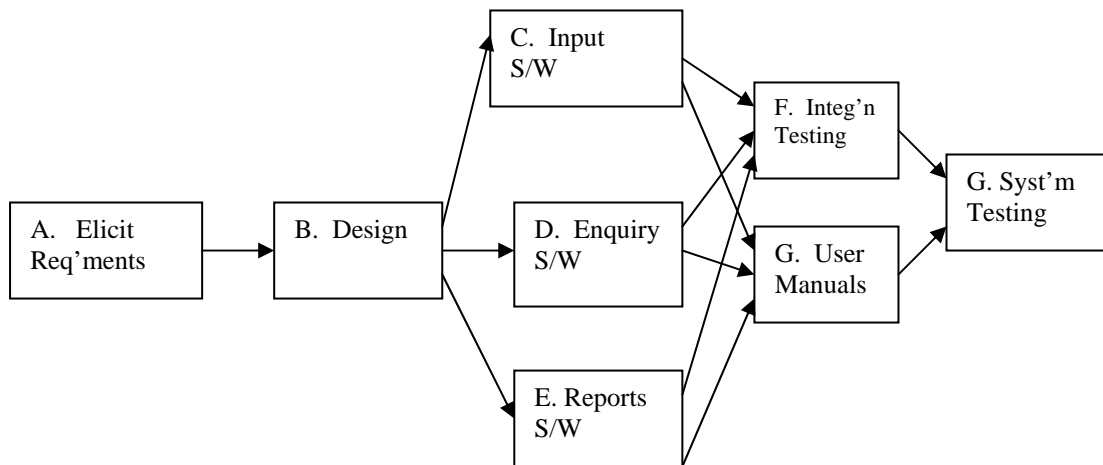
Tasks F and G can run concurrently, but cannot start until all three tasks C, D and E have been completed

Task H must follow tasks F and G

- a) Draw an activity-on-node network diagram for this project, showing the earliest and latest start and end dates, and the float for each node. Use week numbers as the time units. Highlight the critical path on the diagram and state the minimum duration for the project.  
**(11 marks)**
- b) The IT manager has one analyst (named M) and three programmers (named X, Y and Z) available for the project. The analyst is also an experienced database designer, and will write the user manuals. One of the programmers (programmer X) has good experience of developing data input programs.  
  
On the network diagram allocate these four IT staff and the end users to the tasks concerned.  
**(4 marks)**
- c) At the time of the project, programmer Z is no longer available. Bearing this in mind, re-draw the project plan as a Gantt chart. On this diagram name the resources required for each task and state the new minimum duration.  
**(8 marks)**
- d) Briefly, give two advantages of using a Gantt chart, in comparison with an activity-on-node diagram, to display the project plan and resource allocations.  
**(2 marks)**

### Part (a) Answer Pointers

The Activity-on-Arrow diagram should be similar to:



With the following values:

Task	Duration	EST	LST	EFT	LFT	Float
A	3	0	0	3	3	0
B	2	3	3	5	5	0
C	7	5	5	12	12	0
D	5	5	7	10	12	2
E	4	5	8	9	12	3
F	2	12	13	14	15	1
G	3	12	12	15	15	0
H	2	15	15	17	17	0

Preferably with the values incorporated in documented compartments within each Node box in the diagram.

**Marks** were awarded for:

Diagram (no marks for an activity-on-arrow diagram)

Values (as above)

Highlighting (on the diagram) and naming the CP

(ABCGH)

Correct stated duration

(17 weeks)

Use of a recognised standard node notation, with key

(11 marks)

### Part (a): Examiners' Comments

Most candidates produced a reasonably accurate and correct Activity on Node diagram, though (once again) a significant minority produced some form of Activity-on-Arrow diagram, with durations being shown on the arrows. Some diagrams included dummy tasks (which are not valid for an A-on-N diagram).

No marks were awarded for such A-on-A diagrams.

Many candidates provided a separate table of values (as above). It is always preferable to incorporate the values within the Node box (with a key and using one of the standard notations set out in the suggested course texts, such as B.S. 6046).

The most frequent problems were the calculation of EFT and LFT (often omitted) and float; and not highlighting the critical path on the diagram.

### Part (b) Answer Pointers

The most likely allocations of staff and users to tasks here are:

A: M, U  
 B: M  
 C: X  
 D: Y  
 E: Z  
 F: X, Y, Z  
 G: M  
 H: M, U

The question required these to be shown on the diagram in some way.

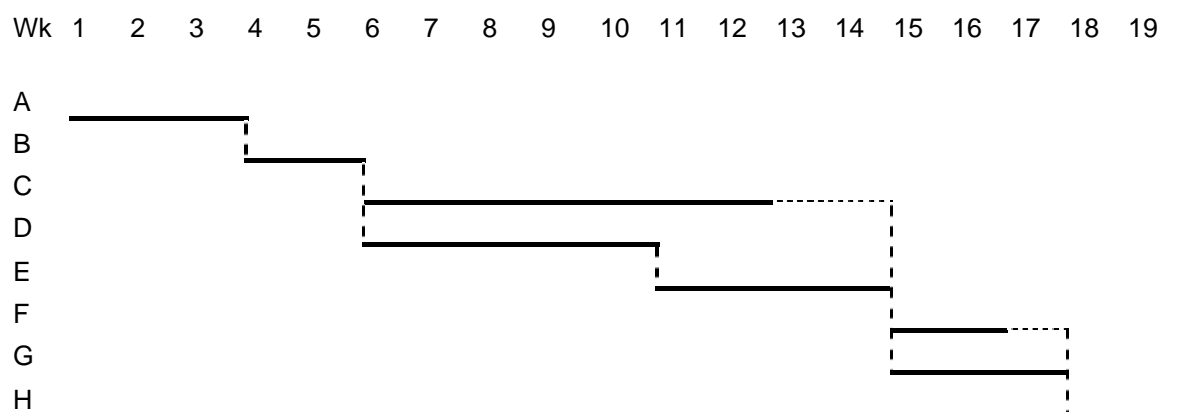
(4 marks)

### Part (b): Examiners' Comments

Several candidates omitted this part of the answer, but generally the staff and user allocations were quite sensible. Most frequent errors were:  
 omitting the users (especially for task A),  
 allocating the analyst (M) to tasks F and G simultaneously,  
 omitting any IT staff from task H.  
 Many candidates did not display these allocations on their diagram

### Part (c) Answer Pointers

A Gantt chart was expected here similar to:



With resource allocations marked clearly on the diagram, and most likely to be:

A: M, U; B: M; C: X; D & E: Y; F: X, Y; G: M; H: M, U

Some variations to this were valid where they followed sensibly from those in part b.

Marks were awarded for correct layout, structure, scale, task durations, dependencies, floats, the naming of resource allocations, and stating the new minimum duration (19 weeks).

(8 marks)

### **Part (c): Examiners' Comments**

Most answers included a valid Gantt chart, although some candidates seemed to be unaware of the correct format. Too frequently diagrams did not show task dependencies and/or did not show task float.

Some candidates provided a "bottom up" diagram (i.e. with task A at the bottom) whereas a top-down approach is often easier for non-technical staff to understand, and enables dependencies to be shown more logically.

### **Part (d) Answer Pointers**

Suitable advantages for the use of Gantt here could include:

easier to read, clearer timescales, easier to see how long and when each person is utilised, makes holiday planning easier, etc (2 marks)

### **Part (d): Examiners' Comments**

Often candidates did not restrict their answer here to address specifically the use of Gantt to display the project plan and resource allocations in comparison with an A-on-N diagram.

Some answers noted that a Gantt diagram could be used for resource smoothing, which is not strictly correct, although it could be used as a basis for resource smoothing (eg by using histograms scaled by time).

#### Question 4

AlphaCo is a manufacturing company specialising in ball bearings. It has grown over the last few years and after a review into its IT systems it has decided to rewrite all the company's IT systems. This task is too big for AlphaCo's small IT department so the contract for creating the new systems has been given to Gammalnc. The role of AlphaCo's IT department is to manage the contractor and implement the finished systems.

- a) Draw a project organisation chart that shows how the two companies can work together. The diagram should consider key roles and who might be suited to them and how roles report/liase with each other.

**(10 marks)**

- b) Create a report format for reporting key information on the project. This report should be completed by the project manager every month and submitted to the client.

**(10 marks)**

- c) Describe possible causes of change in the frequency of this report.

**(5 marks)**

#### Part (a) Answer Pointers

The diagram should show,

- a client or a client committee which owns the project, this may be dominated by AlphaCo but have a representative from Gammalnc.
- a project manager - could be from either company but not a shared role, there should be a direct link to the client
- links to the rest of AlphaCo eg the User community or the IT department. Could be from project manager but would be better from the client committee
- links to Gammalnc. Could be from the project manager but would be better from client committee
- links between project manager and the project team, this should be a unique link as the project manager is the only person who should be directing and controlling the work of the team
- it may show functions such as project support and assurance

#### Part (a): Examiners' Comments

Many candidates found this question difficult. A number of candidates lost marks because they offered up a general management organisation chart, showing CEO, Finance Director, HR departments but not a unique project structure with a project board/committee and in some cases without a project manager. Some candidates also drew process diagrams or lifecycle models. Some candidates did do well and there were examples of answers which included actors such as Project Assurance and Project Support.

#### Part (b) Answer Pointers

2 marks for a well laid out format with information about who has created the report, who it is sent to etc

1 marks for each of the following -time-cost-quality

2 marks for soft issues such as team morale, user satisfaction

2 marks for a comparison of estimates to actuals

2 marks for including information about the future

### **Part (b): Examiners' Comments**

A well answered question with many candidates scoring well.

### **Part (c) Answer pointers**

If the client asked for it more frequently  
If you wanted to reassure the client  
If things were changing quickly  
If tolerance or contingency had been used up  
If a key fixed date was approaching

### **Part (c): Examiners' comments**

This question attracted some imaginative answers. It is clear that many candidates attempted to visualise situations that may occur on a project and offered up answers based on these. A great number of things may affect the frequency of the report and the short list above represents some of the possible answers.

### **Question 5**

A travel agent is considering the replacement of its existing holiday booking system as this system is considered to be too restrictive in the range of options that can be offered to potential clients and users, and can be difficult to use. There are also an increasing number of problems with its continuing reliability and maintenance.

- a) Identify up to FIVE significant factors that might be included in the business case for such a project, together with TWO specific financial measures that could be used to assess its financial viability.

**(10 marks)**

- b) The business case has been accepted and an external company has been commissioned to undertake the project at an agreed cost. The project will comprise:

- i) final agreement of functional requirements
- ii) development and testing of replacement software
- iii) purchase and installation of replacement server, PCs and printers
- iv) implementation and maintenance of new system

For EACH of these four components identify ONE potential problem that might arise, and explain its possible effect on the original business case.

**(8 marks)**

- c) Consider specifically items i and ii above, and identify THREE key reports that the project manager would require from their team in order to monitor and control these stages of the project and ensure that the business case is maintained. Identify a key action that the project manager should take to ensure the effectiveness of this monitoring and control.

**(7 marks)**

### **Part (a) Answer Pointers**

Business case factors could include:

wider range of options to clients – therefore more sales  
easier for sales staff to use – therefore quicker, and thus more potential sales  
as it is quicker to use, then same number of staff can see more potential clients, more efficient sales, etc  
alternatively perhaps fewer sales staff needed, for same number of sales  
fewer lost sales due to system unreliability  
better system should improve motivation, job satisfaction of existing sales staff  
easier to recruit good sales staff  
lower cost of maintenance

**(7 marks for a good 5)**

Typical financial measures are  
payback period  
internal rate of return, etc

(3 marks for a good 2)

### **Part (a): Examiners' Comments**

Overall, answers here were very disappointing. In general the concept and purpose of a business case, which is to justify a prospective IT project in terms of its potential and positive effect on the business, was poorly understood. Too frequently the business case was confused with a feasibility study, the project plan, the system requirements or, in some instances, the principal stages in developing a system.

In some instances candidates did not address their answer to the specific business case set out in the question.

### **Part (b) Answer Pointers**

Re - agreement of functional requirements:

Some requirements omitted, thus the features of the delivered system could be not as wide-ranging as anticipated - leading to fewer sales, higher cost of sales  
Additional requirements discovered – higher initial cost,

Re – development and testing of software:

Misinterpretation of requirements – as above  
Key developer leaves/ill – increases development cost, and increases time until new system can be used, thus affecting IRR and payback period

Re – purchase and installation of hardware

Higher specification H/W required than originally anticipated – higher initial cost, affects IRR and payback period.

Re – implementation and maintenance

System not as easy for staff to use as anticipated, some very slow features, - thus cost per sale, etc increases  
A rival company also implements a new system – so competitive advantage is lost.

(8 marks, 2 per sensible, relevant risk with an explanation of effect on business case)

### **Part (b): Examiners' Comments**

Key risks within each project component were usually well identified, but not their likely effect(s) on the business case (rather than on the project plan itself)

### **Part (c) Answer Pointers**

Key reports (from the team to the project manager) here could include:

Time sheets – leading to:  
progress, and percentage completion, on specific tasks  
Expenditures (if any) and other uses of resources  
Anticipated holidays and other staff absences  
Test plans – based on the agreed statement of requirements  
Test logs  
Quality and other inspection reports  
Risk and exception reports

bearing in mind the overall need to monitor progress and control costs whilst maintaining the business case.

Key actions could include:

- Ensuring that the statement of requirements is fully understood and agreed by the client against the business case
- Setting up regular team meetings to confirm progress and identify any concerns at an early stage
- Cross checking the test plans against the statement of requirements
- Identifying key checkpoints and milestones within the project plan
- Ensuring that Project Board members are quickly aware of any impending situation that might need their immediate action.

(7 marks, in total)

### Part (c): Examiners' Comments

The important issue here was to consider (only) reports FROM the team that would assist the project manager to monitor (usually progress) and control (usually costs) within these two named stages in the context of the business case.

Many candidates did not really appreciate this, and concentrated instead/more on the (standard, regular) reports that the project manager would be expected to produce for the Board.

### Question 6

- a) i) Describe THREE differences between quality assurance and quality control  
(9 marks)
- ii) Provide an example of a quality assurance activity and an example of a quality control activity.  
(4 marks)
- b) What is a peer review and what may influence your decision to adopt it on a project?  
(6 marks)
- c) The emphasis on quality control can sometimes be placed on either inspecting design documentation early in the project or testing the finished products late in the project. Describe THREE advantages or disadvantages of either emphasis.  
(6 marks)

### Part (a) Answer Pointers

Quality Assurance	Quality Control
External to the project, maybe even external to the organisation eg ISO	Internal to the project
Focus is on ensuring the quality checks are taking place.	Focus is on testing/inspecting documents or technical components
Audits of processes against agreed procedures/manuals for the whole project	Checks are done against specific criteria/standards for that component
Quality Assurance reviews/audits must be scheduled into the plan to make sure they happen but external resources may not appear in the plan. More likely to be milestones than activities.	Effort allowances must built into the plan to allow team members time to plan and carry out the checks. Must be shown as activities with a duration and assigned resources.

A typical quality assurance activity might be to review the records of a system test to ensure that the process ensured that all planned tests were carried out, the outcome of each was recorded, and all reported errors were fully corrected and re-tested.

A corresponding quality control activity would be designing and drawing up the test plans and data for this project ensuring their completeness against the agreed requirements – or other forms of testing.

#### **Part (a): Examiners' Comments**

The distinction between these two concepts appeared usually to be understood in principle but often not described very clearly, particularly the over-riding review and audit approach of QA. Several candidates used the “product right” v “right product” mnemonic, but then failed to define adequately the underlying meaning of each.

The choice of examples for a QA activity tended to confirm this apparent lack of understanding.

#### **Part (b) Answer Pointers**

The peer reviewer is an equal not a superior which could make it less stressful  
The peer reviewer must have the expertise to spot defects  
The reviewer must guard against trying to demonstrate their own superiority or any perceived failings in the creator of the deliverable  
Peer reviews may be easier to schedule than a meeting of many people  
Peer reviews can provide a development opportunity for both reviewer and creator  
Peer reviews may involve more than one peer depending on the degree of rigour needed  
Peer reviews are often used on documents rather than software but could be applied to both  
No marks awarded for topics which are generic to all tests, eg they require scheduling, criteria must exist before the test is conducted.

Often used if, for instance, a programmer is quite inexperienced or using a new development method; particularly if their program is a key part of the overall system.

#### **Part (b): Examiners' Comments**

Many candidates omitted this part b from their answer to Q6, implying a lack of understanding of the concept. Those that did answer often failed to distinguish clearly between the more general idea of a “walk-through” and the specific concept of a review by one’s peer – normally someone with specific knowledge and more experience in the subject area.

Very few candidates discussed relevant likely influences to instigate a peer review. Most considered it as another “standard” quality control activity, like a walkthrough.

#### **Part (c) Answer Pointers**

Its more expensive to find defects late in the process  
Its more time consuming at the start of the project to carry out a lot inspection on designs which may change  
It is expensive and time consuming to do both  
There is a pay-off between the amount of testing done and cost/time/market/safety constraints, eg some software vendors have to release patches or fixes to correct errors that were not spotted in testing but its very rare for the control systems of a nuclear power station or the navigation system of commercial airliners to contain software errors.

#### **Part (c): Examiners' Comments**

Again this part was answered poorly on the whole.  
Most answers concentrated on early control activities to help ensure that the project was developed correctly within the constraints of requirements, etc, but very few discussed the trade-off between the need for an adequate product and that for a fault-free product, depending on circumstances.