

THE BCS PROFESSIONAL EXAMINATIONS

BCS level 5 Diploma in IT

IT Project Management

September 2018

EXAMINERS' REPORT

Any **FOUR** questions out of six.

Two hours

Section A

A1.

Syllabus coverage

- 3.3 Appropriate management styles for development projects
- 3.4 Team management, motivation, retention.
- 3.5 The role responsibilities and skills of the project manager

The Question

- a) Project managers can have a range of leadership styles that might be used in managing a development project. Explain **THREE** different types of leadership styles giving examples of where they might be adopted.
(12 marks)
- b) You are tasked with the management of a software development team and note that the team members seem uninterested and lack motivation. Explain **THREE** ways in which you might change team management methods and job design to improve motivation.
(9 marks)
- c) Explain why it is desirable for a project manager to have good communication skills.
(4 marks)

Answer Pointers

Part a)

There are many different ways of labelling management styles.

One example could be:

- Directive autocrat – decisions taken alone with tight implementation supervision.
- Permissive autocrat – takes decision alone but allows team members latitude in implementation
- Directive democratic – participation in decision making but maintains 'micro - management' of implementation.
- Permissive democrat – participation of team in decisions and latitude to team members in implementation more 'hands – off'.

Another model distinguishes between task-orientation and relationship-orientation. A key point is that good managers will vary their approach depending upon the circumstances.

Maximum 12 marks

Part b)

Two approaches chosen from:

- Setting specific goals – should be demanding but realistic, and involve staff in setting goals to make them acceptable.
- Provide team feedback – let people know how they are seen as performing by giving indications of progress
- Job design – specifically candidates might focus on job enlargement and job enrichment as two approaches that increase the number and variety of roles given to team members
- Enlarging job to include non-programming tasks such as supervisory and line management roles and responsibilities. Forming meaningful/satisfying tasks can improve motivation as in Oldham-Hackman job characteristics. Suitable explanations might refer to this model or other models based on Maslow or Herzberg (although precise sources are not needed.)

3 marks only for each description and extra 3 marks explaining total.

Maximum 9 marks

Part c)

For example, project manager needs good communication skills in order to:

- present technical details to management and other non-team stakeholders.
- communicate with higher management on changes to a project's course of actions.
- coordinate team members
- enhance motivation among team members.

Maximum 4 marks

Examiners Comments

This question was the most popular choice of Section A.

Part a)

This was well answered by the large majority of candidates. Various well recognised leadership styles were described. Some candidates did however drift into a more general discussion of management. Weaker answers did not go much further than contrasting a strict 'autocratic' with an easy-going 'democratic' style.

Part b)

Reasonably well answered by most. A general failing to focus solely on the award of pay and holidays, and not take note that the question asked for how team management and job design might be used.

Part c)

Surprisingly quite a few candidates failed to give a convincing answer to a common sense question

A2.

Syllabus coverage

- 5.3 Risk management tactics, including risk avoidance, risk transfer, risk reduction, risk mitigation and contingency planning
- 5.5 Risk registers

The Question

- a) Risk reduction and risk transfer are two techniques that can be used to manage risk in a project. Using suitable examples explain both risk reduction and risk transfer.
(10 marks)
- b) Explain and give an example of how contingency planning can be used in risk management.
(6 marks)
- c) Describe with the aid of a sketch an outline of a typical project risk record template. Include within the template an example of the data it might contain.
(9 marks)

Answer Pointers

Part a)

Risk reduction – this focuses on reducing the probability of a specified unwanted outcome. Among other examples could be reducing the risk of errors in delivered software by peer review and testing of code.

Risk transfer – transfer risk to other parties. One example is outsourcing delivery for part or all of high risk items, particularly where the contract is fixed-price. Insurance is another example where high risk projects have some costs offset by insurance.

Up to 5 marks for suitable examples. Up to 5 marks for a correct explanation. Up 10 marks in total.

Maximum 10 marks

Part b)

Contingency planning is planning for when the risk event materializes. This type of planning provides for project continuation in the event of defined risk (i.e., staff sickness, key equipment failure). Examples are relocation plans for disaster recovery which set aside access to temporary accommodation or alternative network links that can be brought into use in case of network failures.

6 marks for an explanation with appropriate example (see Hughes & Cotterell pp 173-174 for examples).

Maximum 6 marks

Part c)

A typical risk record will typically have the risk ID, title of risk, risk for pre-mitigation measures, post-mitigation measures, owner, risk status and date of risk being raised. There will be sections for risk description, impact description and recommended mitigation. Further sections might be added dealing with measured values of probability/impact and a further history record fields.

2 marks for key headers further 2 marks for remaining fields and 1 mark for sketch outline. A further ½ mark for correctly entering each example field data up to eight major fields (4 marks).

Maximum 9 marks

Examiners Comments

This question was the second most preferred choice in Section A. However, many candidates found the questions quite difficult to interpret correctly. There was a significant number of candidates who made no serious attempt to answer the question in an appropriate manner.

Part a)

Many candidates performed well on this question although some correctly described the differences between reduction and transfer of risk but then had incorrect or weak examples.

Part b)

This proved quite problematic to many candidates, with few gaining maximum marks mostly due to being unable to give an appropriate example.

Part c)

It proved relatively easy to gain minimum marks for providing a template with headers but much more difficult giving meaningful examples of content.

A3.

Syllabus coverage

6.1 Definition of product quality and software quality

6.3 System quality specification and measurement, including overview of ISO9126

The Question

- a) ISO 9126 and its successor ISO 25010 quality standards refer to external software product characteristics. Describe any FOUR of these characteristics. **(12 marks)**
- b) Discuss some of the difficulties in making an overall assessment of product quality from the combined ratings of product characteristics. **(8 marks)**
- c) Explain ways in which software quality is distinguished from other types of product quality. **(5 marks)**

Answer Pointers

Part a)

ISO 25010 is a development from ISO 9126 and identifies the following top-level software quality characteristics:

- Functional suitability. Does the system as delivered meet the functional requirements of the user? Meeting user expectations is more than just meeting a specification.

- Performance efficiency. For example, how fast does the system execute functions? What hardware resources does it need? How many users can access the system at one time?
- Compatibility. Can the new system operate with existing systems? In particular, can it share information with other applications?
- Usability: Is the system straightforward to use? How much training is required for someone to use it?
- Reliability: How often does the system break down? How long does it take to put right? In general, software that has been in use by a large number of people over a long period of time is likely to be reliable. This because over time most of the faults will have been detected and correct. Hence the use of the term 'software maturity'.
- Maintainability: Can this software application be modified easily and without introducing unexpected errors?
- Portability: how easy is it to move the software from the particular platform on which it was developed to another environment?

3 marks for each of 4 descriptions from the above (or ISO 9126 alternatives)

Maximum 12 marks

Part b)

Answers require a discussion of a range of issues with the ISO 24010/9126 approach. Possible issues include the following:

- The different characteristics are measured in different ways, for example, usability might be measured as the time required to carry out a task while reliability could be measured as mean time between failures. This makes combining quality measures difficult.
- One good quality might be at the expense of another, for example, efficiency could be improved by tailoring software to execute quickly on a specific platform but this might reduce portability to other platforms.
- Different applications will have different needs. Some for example may be safety critical, so that reliability may be crucial, while for other applications limited reliability may be less threatening

Maximum 8 marks.

Part c)

General product quality centres on 'fit for purpose' and largely relates to the procedures described in ISO 9001 which define the design of quality management systems (QMS). Quality for a product is defined as 'fit for its intended use'. This has to be specified in conjunction with the final users/customers for a particular product.

The ISO 9001 approach could be applied to software. With software, ISO 9126/25010 identify the qualities that are generally of importance to the customers/users of software. This framework supports the more precise definition of the required characteristics of an individual software product. There are many ways of ensuring software qualities, but most involve some inspection and review of code and/or practical testing of completed products.

Maximum 5 marks

Examiners Comments

This question was by far the least popular of Section A. However the pass rate was best overall with approximately three quarters of candidates achieving a pass mark or better.

Part a)

This attracted many highly competent answers showing a very good appreciation of the topic.

Part b)

This proved more difficult for some candidates with many not able to distinguish between the different types of quality characteristics being incompatible although a reasonable number of attempts showed an appreciation of product quality measurement issues.

Part c)

This question appeared to pose a particular problem for many. Once again, a few candidates were able to succinctly see product as largely 'fit for purpose' and software as largely concerned with specification being correctly implemented.

Section B

Overall comments.

There was a continuing tendency for candidates to overlook the stated requirement for a specific number of items in many of the questions, such SIX "items" in B4a, THREE "other characteristics" in B5a, FIVE actions in B5b, THREE, ONE and ONE in B5c and THREE (twice) in B6c. No additional marks are awarded when such limits are exceeded.

B4.

Syllabus coverage

- 4.3 Project control through monitoring; use of plans in project control (comparing actual and planned progress)
- 4.5 Types of report: exception, progress (or checkpoint), management (e.g. highlight reports)
- 4.8 Assessment of implications and impact on the project of deviations and changes to project plan

The Question

For a particular project it has been decided that the project manager should produce a report for the project board (or steering committee) at the end of each four-week period.

- a) Describe SIX items of information that should appear on this report.
(9 marks)
- b) Explain at least FOUR different ways in which the project manager could obtain the data used to generate the information in the report.
(9 marks)
- c) A problem with the project is that the users keep asking for changes to the requirements. Discuss the likely reasons for this and what might be done to deal with this problem.
(7 marks)

Answer Pointers

Part a)

Up to a total of 9 marks for a good clear description of (only) 6 varied items of information required in this type of (board level) 4-weekly progress report. These could include:

- Dates of reporting period
- Activities scheduled to be completed within time period which have or have not been completed
- Activities scheduled to start within the time period which have or have not been started
- Targets for next month
- Staffing – any changes e.g. leavers/starters
- Costs to date: budgeted and actual costs for completed activities, costs of uncompleted activities, and projected total costs
- Changes to scope of the project
- Risks – currently identified risks and their status
- Outlook for project
- Any board level decisions that are required now or likely within the next four weeks

1 mark per list item plus half for a clear description, but no marks awarded for a single word list item with no description at all.

Part b)

Maximum 9 mark

Up to a total of 9 marks for an informed clear explanation of four or more different sources of report information, identifying the relative importance and content of each. Typical sources could include:

- Checkpoint meetings with staff
- Timesheets from staff, together with estimates of completion for specific tasks that each is working on
- A project accounting system (which probably gets information from timesheets), and/or the organisation's accounting system
- Requests for change – from change management system
- Risk register – could be updated at checkpoint meetings etc
- Staffing details – from HR reports; induction/termination procedures
- User feedback

Part c)

There are two distinct issues here: the effect *and* the possible underlying reasons/causes for these repeated requests for changes during development. Up to 4 for the reasons and up to 3 marks for managing the effects.

For example, the effect (i.e. the increasing number of requests for change) could be formalised and prioritised by introducing a change control system, where a change control group have to assess the importance of each requested change and approve, reject or suspend the request. Exception reports might then have to be presented to

the board where the overall cost/duration of the project could exceed planned tolerances.

The cause might be a lack of users' understanding of the system under development. This might be due to a failure to involve all potential users when the list of requirements was drawn up or a lack of understanding by the users of the full benefits and outputs from the new system once it is implemented.

This could be met now by the use of prototyping /screen mock-ups, or producing some outline user manuals etc. so that users get a better idea of the way the new system will work in practice.

Agile development methods could also be introduced if appropriate at this stage of the project.

Maximum 7 (4 + 3) marks.

Examiners' comments

Part a)

The key factors for this report are that it is 4-weekly and intended for the project board.

Thus it needs to be at a summary level, while informing the board adequately and clearly of the current status of all aspects of the project.

Most candidates understood this, but there was a clear tendency to concentrate on actual progress issues at task level, for example, by providing lists of tasks and their current status - without putting this detailed progress reporting into an overall context. Some included actual staff time sheets in such a report or the WBS. Such detail would not be appropriate for the board. Wider considerations, such as staffing issues, were frequently omitted. The 4-week time frame was rarely mentioned. Some confused the 4-weekly progress report with once-off reports, such as the feasibility study.

Part b)

Overall this part of Q4 was answered the least well.

Most candidates explained information sources but often the nature and relative importance of each was not explained. Some concentrated too much on different types of meetings and standard information such as time sheets and financial records to the detriment of individual discussions with staff in order to anticipate likely future progress. Many inappropriately mentioned questionnaires.

Some candidates included the tools used to present the information (for example, project plans showing progress to date) rather the source(s) from which this information was derived.

Part c)

Most answers concentrated on the likely causes of the problem, rather than methods both to reduce its effect and to deal with the underlying reason(s).

Most candidates recognised the need to use prototyping to enable users to visualise the proposed new system, but did not mention the additional time and cost involved.

When considering the increasing number of change requests, some candidates suggested that there should have been a more rigorous definition of requirements,

and therefore none (or few) of the change requests should be accepted. Others suggested repeating the requirements definition stage, but it is probably too late to do this. Both ignored the underlying problem and would not, on their own, have helped produce an acceptable new system.

Many candidates did not address this second issue, of managing the problem, at all and disappointingly few mentioned the need for some form of practical change control system, with full consideration of the each of the requests being made.

Overall many described avoidance measures rather than pro-active actions.

B5.

Syllabus coverage

- 1.3 Establishing project objectives, goals and measures of success
- 1.7 Installation issues, including methods of going live
- 1.10 Project support activities, including configuration management and change control

The Question

- a) One key characteristic of a successful project is that it is completed on time. Identify THREE other key characteristics of project success, explaining why they are important. **(6 marks)**
- b) Identify and describe FIVE key actions in the change management process, when dealing with change requests. Who is likely to be responsible for each action? **(8 marks)**
- c) One method of implementing a project is known as immediate or direct changeover. Summarise the main advantages and disadvantages of this approach. Identify THREE other possible implementation methods and describe ONE advantage and ONE disadvantage of each of these three. **(11 marks)**

Answer pointers

Part a)

The other three elements are 'scope', 'quality' and 'cost'. 1 mark each for naming these plus 1 mark for each valid explanation of the importance of each element up to a maximum of 6 marks

Part b)

Note that different organisations might have their own variation of the generally accepted standard process, which is:

Step	Carried out by
Submit the Request for Change	Usually a user or member of the development team
Receive, review and log the request	Usually the change manager
Decide whether a need to determine its feasibility	Often the project manager
Assess scope, impact and cost	Usually the change feasibility group
Decide on outcome (i.e. approve, reject or defer)	Usually the project change control board

Implement change (if approved)	Usually the development team/change implementation group
Update configuration management system	The change controller
Evaluate change	Often the project manager or perhaps CCB

1 mark for EACH key action named (from the above) up to 5 marks, with a sensible brief description, plus 3 for naming those responsible.

Maximum 8 marks

Part c)

2 marks for summarising the main advantages (e.g. relatively inexpensive) and disadvantages (e.g. can be very risky) of a direct changeover.

The other 3 methods are parallel run, pilot changeover and phased take-on.

Change-over strategy	Description	Advantages	Disadvantages
Parallel run	old and new systems run in parallel for period of time	safer, as can usually reinstate the old system	expensive on resources and time as old and new systems are run simultaneously
Pilot changeover	e.g. the whole system implemented in one specific branch, preferably not a critical user	can test the new system without affecting the whole organisation	the selected branch may not use the whole system
Phased take-on	i.e. the new system being implemented throughout the organisation module by module	each module can be checked throughout the organisation before moving on to the next.	the output of one new module may not be compatible with input to the next (old) module very time-consuming (and thus expensive)

1 mark for identifying each of these plus 2 for each of their advantages and disadvantages.
Maximum 11 marks

Examiners' comments

This was by far the most popular question in Section B, though part b was often omitted completely, losing 8 marks immediately. This implies a worrying lack of knowledge of the change management process (as also noted in Q4b).

Part a)

This is straightforward bookwork, though many explanations of the three characteristics omitted any reference to why each is important. Several candidates put forward inappropriate concepts such as "good team building" and "control".

Part b)

Note that the assessment, decision and implementation are the three most key actions, which ideally should always be identified. Many answers omitted any description and often did not name any responsibilities for each action.

Part c)

This was usually answered well, though some candidates confused pilot changeover with phased take-on. Others did not realise that 'immediate or direct changeover' is the same as big bang. Often only two (rather than the specified three) other possible implementation methods were included.

B6.

Syllabus Coverage

- 2.2 Use of (activity on node) precedence plans and network analysis
- 2.3 Critical path analysis
- 2.4 Gantt charts

The Question

A small trading company has decided to commission a small local software house to develop a new order processing system. This will replace the existing system which is run by an external service provided. The system will be used by three main sections of the company:

- Order processing (OP)
- Invoicing (IP)
- Receipts processing (RP)

each of whom have their own specific requirements and will require online access to the new system.

The outline plan includes the following main activities:

- **A, B, C.** Gather requirements for each of the three company sections - this can be done in parallel for each section, and will take 3 weeks for the OP section, 4 weeks for the IP section and 5 weeks for RP section.
- **D.** Consolidate requirements – this is dependent on the completion of the activities A, B and C above and will take 2 weeks
- **E.** Design software – dependant on requirements consolidation (activity D), to take 4 weeks
- **F.** Build and test software – dependent on software design (E), to take 8 weeks
- **G.** Order and delivery of communications equipment and hardware - which is also dependent on requirements consolidation (D) but can run in parallel with the software design (E), to take 9 weeks
- **H.** Install communications equipment and hardware – dependent on order and delivery (G), to take 2 weeks
- **I.** Design acceptance testing cases – also dependent on requirements consolidation (D), to take 6 weeks
- **J.** Integration testing – dependent on both build and test software (F), and the installation of communications equipment and hardware (H), to take 3 weeks
- **K.** Acceptance testing – dependent on acceptance test design (I) and integration testing (J), to take 3 weeks.

- a) Calculate the earliest and latest start and finish times and the floats for each of the above activities and present them in a table. Identify the critical path and state the minimum duration for the project.

(10 marks)

- b) Just before the project starts it is realised that, due to the absence of key staff, the requirement gathering for the IP section (activity B) will now take 5 weeks. Also, that the communication and hardware installation (H) will now take 5 weeks. Re-calculate and re-present the table that you produced for part a, and identify any other changes that might result from these changes.

(8 marks)

- c) You could use either an Activity on Node network diagram or a Gantt chart to display this information. Discuss three advantages of each approach.

(7 marks)

Answer Pointers

Part a)

The question expected a table similar to:

Activity	EST	LST	EFT	LFT	Duration	Float
A (OP)	0	0	5	5	5	0
B (IP)	0	1	4	5	4	1
C (RP)	0	2	3	5	3	2
D	5	5	7	7	2	0
E	7	8	11	12	4	1
F	11	12	18	19	7	1
G	7	7	17	17	10	0
H	17	17	19	19	2	0
I	7	16	13	22	6	9
J	19	19	22	22	3	0
K	22	22	25	25	3	0

From this:

6 marks awarded for correct EST, LST, EST, LFT values in the table

2 marks for correct floats in table

1 mark for naming the critical path

ADGHJK

1 mark for the correct minimum duration

25 weeks

Maximum 10 marks

Part b)

This expected a similar table:

Activity	EST	LST	EFT	LFT	Duration	Float
A (OP)	0	0	5	5	3	0
B (IP)	0	0	5	5	5	0
C (RP)	0	2	3	5	5	2
D	5	5	7	7	2	0
E	7	7	11	11	4	0
F	11	11	20	20	9	0
G	7	8	17	18	10	1
H	17	18	19	20	2	1
I	7	17	13	23	6	10
J	20	20	23	23	3	0
K	23	23	26	26	3	0

From this:

5 marks awarded for a fully corrected table (including float)

3 marks for other changes:

two new critical paths: ADEFJK and BDEFJK

minimum duration 26 weeks

Part c)

Up to 1 mark for each of the 3 advantages discussed for each of A-on-A and Gantt, plus 1 for quality of discussion which, ideally, should include some comparison of the two sets of just three advantages, i.e. a maximum 7 marks

Typical advantages of an A-on-N diagram are:

- easier to calculate AND display any amended values,
- better for displaying dependencies,
- float is more clearly defined and displayed for each task,
- the critical path is easier to highlight and see,

whereas a Gantt chart:

- is more visual, especially for non-technical staff
- shows concurrent tasks more effectively
- is a better basis for staff allocation
- can be used to highlight progress on every activity
- shows the time scale.

Examiner's comments

Unusually this "Critical Path" based question was by far the least popular in this section of the exam paper.

Parts a) and b)

The earliest and latest event dates were usually defined correctly, but there were wide variations in the understanding and calculation of float (some even having negative floats) and the essential relationship between zero float and the critical path.

Some candidates produced a table with the correct headings, but then listed the wrong values under these headings – implying a lack of understanding of the four standard abbreviations EST, LST, EST, LFT.

Many candidates supplied an A-on-N or A-on-A diagram (or some incorrect combination of both), and not the table specified. Reduced marks were awarded here, provided that the correct values were shown.

Some candidates introduce an unnecessary dependency between E and G to force activity G to run in parallel with activity EWil. This incorrect dependency then affected the remainder of the calculations and the critical path. Some allowance was made for this error when awarding marks.

Part c)

Consideration of the two alternative approaches was often very brief, with lists rather than discussion, though were some well-argued discussions. Sometimes the same advantage was listed against both approaches, for example "easier to show the critical path".

Note also that the question required only three advantages of each approach to be discussed, and did not ask for "disadvantages".

