BCS THE CHARTERED INSTITUTE FOR IT
BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

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EXAMINERS' REPORT

IT PROJECT MANAGEMENT

Section A

Question 1

Answer Pointers
a)   Projects that would be suited to agile have the following features

- Size - When it is small agile is better,
- Increments - When a bit of code is needed at a time, increments rather than big bang
- Requirements -Where the requirements are unclear
- Resource - Availability of the users
- Cost - Not so much about the amount but whether there is room to increase

 A maximum of 2 marks for each feature up to 10 marks awarded

b)

i) prototyping is useful when:

- when the requirements are not clear and there is the potential for a user involvement
- it is iterative and the design evolves with each user review, or a single prototype is made and discarded after it has been demonstrated
- it is a good way of getting the users a) input and b) buy-in before real coding starts
- it can be used for designing interfaces as well as designing functions
- it consumes a lot of user time up front
- it can be a way of fixing the time / budget of a project at the expense of functionality (by limiting the number or iterations)

A maximum of 2 marks for each benefit up to 10 marks awarded

ii) timeboxing

- Timeboxing is a way of fixing the time and cost of a project by limiting function/scope.

3 marks

- A plan is broken down into timeboxes which guillotine development on that particular part of the project at the end of the timebox. Whatever is created at that point is baselined and effort then switches to the products in the next timebox. It is not suitable for every project because it needs a platform that will allow for a product to be baselined in what would normally be an unfinished state. It is not suitable on projects where sub-optimal functionality is acceptable eg life and death systems such as Air Traffic Control.

2 marks

Examiners' Guidance Notes

a) This question asked students to apply their knowledge of Agile methods to types of projects. Good answers considered the attributes of projects as much as the attributes of Agile. Answers that simply described features of an Agile approach did not score well. Sadly, a large number of students simply described Agile.

b) This question asked for an explanation of what prototyping is and what benefits it might bring. Overall the question was answered well and many students managed to identify the majority of attributes and benefits..

c) The third part of this question was aimed at challenging the more able students and many students struggled with it. They key point about timeboxing is that time is fixed while cost and function are adjusted accordingly. Some answers said it was a way of ensuring that a project stayed on track but not how it would do this.

Question 2

Answer Pointers
a)
- examine the technical requirements of the task
- examine the critical or crucial condition of the task
- check that you have the resource to do the task
- check the availability of resource
- consult the resource
- examine employment history and career plans of each staff member for experience and development opportunities

A maximum of 2 marks for each step up to 12 marks awarded

b)
- if you allocate a resource who is doing it for experience they may be slower and you may want to increase the duration of the task
- if there is an experienced resource who would be ideal for the task but who is unavailable you might want to delay the task or reschedule it
- if you have to hire in resource because there is no one who can do it then it may cause a delay
- if you alter dependencies it may affect the Finish date or amount of float, which in turn may lead to resource clashes

A maximum of 1 mark for each amendment type up to 4 marks awarded

c) Others factors include the following:
- may use Belbin to select people but this is difficult on small teams,
- may want to consider how many of the team members have worked together already so they will have gone through the Tuckman/Jensen four stages (forming, storming, norming, performing) when new members have not
- there may be underlying motivational hygiene/maintenance factors which prevent you from motivating the team or equally there may be opportunities to incentivise the team (see Herzberg)
- may want to avoid giving one person all the unenviable tasks

A maximum of 3 marks for each factor up to 3 marks awarded.

Examiners' Guidance Notes

a) This question quite specifically asked about assigning resource to a task but many students talked about assigning a resource to a system or a project. This led them onto an answer that involved recruitment. There were no marks for students who gave an answer about recruitment as this completely missed the point.

b) This question followed on from the a) and where student described the recruitment process they were often unable to score well in this question. Those that directly linked their answer in a) to their answer in this question scored well as the question asks them to do that. Some marks were given to students that listed some generic amendments that might be made to a plan.

c) In some respects this question allowed students who had knowledge of this area but who were unsure how to relate it to the two earlier questions to score marks. It was anticipated that most of the answers would link to the suggested answer above. However, marks were awarded for answers that could have been given in earlier answers but were not. The same answer in two places didn't earn two sets of marks.

Question 3

Answer Pointers

a) Answers may have included the following approaches

- Bottom Up
- Delphi
- Expert Opinion
- Top Down
- CoCoMo
- Function Points
- Analogy
- Standard Product

In discussing the advantages and disadvantages it is likely that the following relative measures could be used, simplicity, expense and accuracy. Each will differ in these three key areas from the others on the list. Up to 3 marks were given for each approach up to a maximum of 15.

b) Actions to get project back on track included:

- Add more resource, extra people or the same people working longer hours
- Add faster resources, more experienced / efficient
- Change the dependencies to alter critical path
- Break large chunks of work down into smaller ones to increase concurrent activity
- Reduce the scope of the project

. Up to 2 marks were given for each action up to a maximum of 10.

a) On the whole this question was answered well. Most marks were lost for failing to say what the advantages and disadvantages of each technique was. 1 mark was awarded for each technique the student knew but advantages and disadvantages were needed for all three marks.

b) Most candidates were able to identify the key responses. A many candidates included quite significant responses such as outsourcing or buying software. This question was about an immediate response to a single task which may slip if not dealt with. Marks were awarded if the candidates suggested asking the Project Owner for a new end date, though the question was strictly about how to keep a task on track.

Section B

Question 4

Answer Pointers

a) This expected an A-on-N network diagram similar to:
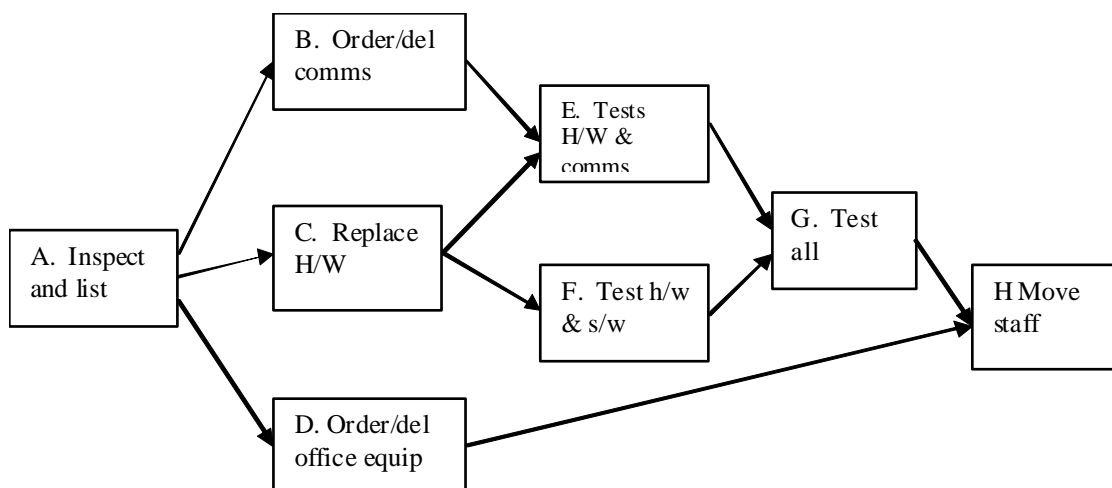
with the following values shown **within each node** on the diagram, preferably within documented compartments within each Node box and using one of the standard node layouts (otherwise a good key was required), **and** the critical path **highlighted** clearly on the diagram

| Task	Duration	EST	EFT	LST	LFT	Float
A	3	0	3	0	3	0
B	10	3	13	3	13	0
C	8	3	11	4	12	1
D	11	3	14	5	16	2
E	1	13	14	13	14	0
F	2	11	13	12	14	1
G	2	14	16	14	16	0
H	1	16	17	16	17	0

Up to 11 marks awarded for

- Diagram, layout and clarity (with all tasks arrowed)
- Correct Values
- Highlighting and naming the Critical Path **(ABEGH)**
- Stating the correct Minimum duration (**17 weeks**)

b)
The only changes to the above diagram are to the values: LST (3), EFT (16), float (0) and duration of task D. (NB It is important for candidates to realise that these values should always be considered as part of a full A-on-N diagram) **and** the addition of a second critical path (as the duration of path ADH is now also 17 weeks)

5 marks for identifying and **explaining briefly** all of these changes.
c) This expected a Gantt chart similar to:

Weeks

| 1 | 5 | 10 | 15 | 17 |

A
B
C
E
F
G
D
H
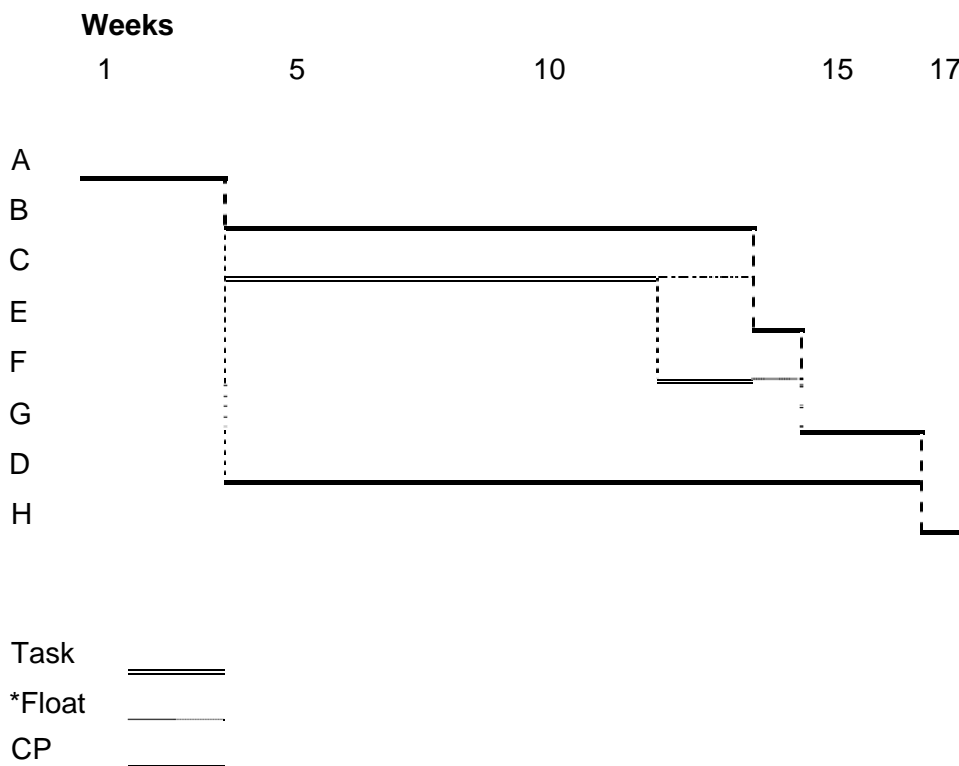
Task ‗‗‗‗‗
*Float ‗‗‗‗‗
CP ‗‗‗‗‗

This should be well scaled and structured with correct task durations and show clearly all dependencies, float and highlight __the two__ critical paths.   Up to **9 marks** awarded with (usually) 1 mark deducted for each clear omission.
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Examiners' Guidance Notes

This was the most popular question in Section B, and also the most well-answered.

a)   Most candidates produced a reasonably accurate and well laid-out A-on-N diagram, though there were still some A-on-A diagrams. Arrowheads were very often omitted, but this was not penalised unless any of the main dependencies were drawn flowing from right to left or bottom to top (which sometimes occurred with those between G, H and D in particular). Similarly with Start and End nodes – which are __not__ required in an A-on-N diagram (as stated in the question). Other frequent problems included the calculation of EFT and LFT and the omission of float (especially 0 float) as a Node value box (although a correct critical

path was still stated), failure to highlight the critical path and, sometimes, to state the minimum duration (in weeks). Many candidates calculated (wrongly) the float on task C to be 2 weeks. Worryingly, some candidates calculated (by addition) the length of the various task paths from A to H and then stated the minimum duration to be that of the shortest such path – not that of the Critical Path. This seemed to demonstrate a lack of understanding of the concept of a Critical Path.

b)   Most candidates realised that the outcome result of this change was to make Task D critical, resulting in a second critical path. Changed values were not always stated and explanations were often weak. Worryingly, some candidates quoted a "consolidated" critical path as a single string of all tasks with zero float, (i.e. ABDEGH) which (again) perhaps reveals a lack of understanding of the concept of a critical path.

c)   The outline layouts were usually quite good, though the scaling of task durations was inaccurate or misleading in several answers. Other problems included failure to show most/all dependencies (often full dotted lines were drawn **all the way down** to the lower x axis, i.e. not terminating at the dependent task(s)), not highlighting the second critical path and not showing floats. Such charts are usually easier to follow if the tasks flow down (from top left to bottom right) rather than up (from bottom left to top right).
Similarly dependencies are very difficult/impossible to show if a bar chart format is used with no gap between each of the tasks.

Question 5

Answer Pointers

a)   **Up to 9 marks** awarded for a good clear description of up to 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 issues and any staffing 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 within the next 4 weeks

Up to 4 marks were **deducted** if only a list of such information was supplied, with no description at all.

b) **Up to 9** marks for an informed clear explanation of **4 or more** different sources of such report information, recognising the relative importance of, and the type(s) of information that might be obtained from, each data source. 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

   Up to 5 marks were **deducted** where only a list of sources was provided, with no relevant explanation.

c) There are two distinct issues here: the effect (as stated in the question) and the possible underlying cause(s) for these repeated requests for changes during the development phase. Full marks were awarded if both of these issues were identified and discussed.

   For example, the "effect" of the increasing number of requests for changes to the requirements could perhaps be formalised and prioritised by introducing using a **change control system**, where a change management group (which has representatives both of the development and the client/user management) have to assess the importance of each requested change and approve, reject or suspend the change. Exception reports might then have to be made to the overall project board where the overall cost/duration of the project could exceed planned tolerances

   The "cause" might be a lack of users' understanding (say, visualisation) of the system under development. This might have been 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 completed. This could be met now by the use of **prototyping/screen mock-ups**, or producing some outline user manuals etc (perhaps with interim training) so that users get an idea of the way the new application will work in practice. **Agile** development methods could also be introduced if appropriate at this stage of system development.

   Up to 7 marks for a sensible discussion along these lines.

Examiners' Guidance Notes

a) The key points for this report are that it is 4-weekly and intended for the project board. Thus it needs to be at a summary level, whilst 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 – e.g. by providing lists of tasks and their current status - without putting this detailed progress reporting into an overall context. Wider considerations, such as staffing issues, were frequently omitted.

Several candidates concentrated too much on low level detail – e.g. by suggesting the inclusion of all staff time sheets in such a report. Such detail would not be appropriate for the board

b)   Important issues here are the relative importance of each identified information source, as well as the type(s) of information that might be obtained from each.

Most candidates recognised this, though often the relative importance aspect was not then considered. There was also a tendency to concentrate too much on time sheets rather than individual discussions with staff in order to anticipate likely future progress as well as record actual current progress.

On the other hand there were also much more general answers, such as "questionnaire" or "monitoring" without any explanation as to how such methods might be used, with/from whom, and what specific data might be obtained from such a method.

Some candidates included the tools used to present the information (eg project plans showing progress to date) rather the source(s) from which this information was derived. Thus a project plan (e.g. Gantt chart) is a source of information **against which** current progress can be illustrated, but it is not a "full" source in its own right.

Very few of the less important, lower priority, sources were mentioned.

c)   The context of the question is important here, as well as the need to differentiate between the two different issues that, ideally, might need to be resolved separately.

Many candidates suggested the use of prototyping to enable users to visualise the proposed new system (and thus reduce the number of requested changes), but often did not then realise that this might require a change in the current development method, and possibly a delay in the project delivery date. Few mentioned any other possible ways of resolving this particular issue although "user training" was suggested in some answers, but without any discussion as to how this might help.

When considering the increasing number of change requests, some candidates suggested that there should have been a more rigorous definition of requirements originally, but did not then propose how this could be rectified and any implications (for instance by repeating the requirements definition stage – and probably then missing any agreed implementation deadline). Others suggesting ignoring all future requests, but did not then consider that this might not then produce an acceptable new system. Many candidates did not address this second issue at all, and disappointingly few mentioned the need for some form of practical change control system, with full consideration of each of the requests being made. Some of the better answers did suggest a switch to an Agile development method.

Meetings with users were often proposed, but with no clear purpose or intended outcome.

Question 6

Answer pointers

a) **i)** The headings for the "standard" differences are:

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.

The question required much fuller descriptions and explanations of these differences bearing in mind that in **Quality control** the focus is on checking the products created by the project/system and eliminating or reworking those that are defective whereas
in **Quality assurance** the focus is on checking that the appropriate quality control processes are taking place and being carried out effectively

Up to **3 marks** were awarded for such descriptions/explanations of **each of 3** of these differences. **Total = 9 marks**

ii) 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.

Up to 2 marks each for a pair of good, valid examples. **Total = 4 marks**

b) **Up to 4 marks** for a good, clear description of a peer review (including a clear definition of a peer reviewer), to include at least 4 of the following points:

- A peer is normally someone with specific knowledge and more experience in the subject area
- 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 any points that are generic to other types of testing, e.g. they require scheduling)

Plus **a further 2 marks** for the discussion of when it might be appropriate to adopt this method of testing on a project. For instance, if a programmer is quite inexperienced or using a new development method, particularly if their program is a key part of the overall system.

c) Typical advantages/disadvantages here could include:

- It is more expensive to find defects late in the process
- It is more time consuming at the start of the project to carry out extensive inspection on designs which may change
- It is expensive and time consuming to do both.
- An early focus on quality could help to set the quality standard for the project

- Need to make the point that there is a pay-off between the amount of testing carried out and any cost/time/market/safety constraints, e.g. 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.

2 marks awarded for each of the required **3 (three)** descriptions of good, valid advantages/disadvantages of either emphasis. **Total = 6 marks**

Examiners' Guidance Notes

This question was also quite popular in Part B, but not answered as well as similar questions in recent years. In particular, in part a), fewer candidates seemed to understand fully the differences between the concepts of QA and QC and in part b) there was very limited understanding of the meaning of "peer" in "peer review".

a) The distinction between these two concepts often appeared unclear. The headings were known but often not described very clearly, particularly the over-riding review and audit approach of QA and the "external v internal" headings in the "standard" difference table. Several candidates used the "product right" v "right product", "verification v validation", pro-active v re-active", internal v external" or other simple mnemonics for the difference, but then failed to define adequately the underlying meaning of each.

There was often confusion about the timing of each within the project. The QA should be in place at the outset – and certainly not be deferred until after project completion. In some instances it was stated (incorrectly) that QC could also only take place after project completion.

The choice of examples for a QA and a QC activity tended to confirm this apparent lack of understanding. Where examples were given, a significant number related entirely to non-IT projects; far better to consider IT projects here.

b) Many candidates omitted this part b from their answer to Q6, implying a lack of understanding of the concepts of both "peer" and "peer review". 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. Many answers referred to "testing" rather than "checking" or to a form of "team meeting", and sometimes even to an appraisal review or brainstorming.

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

c) 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.

Several answers listed only some advantages/disadvantages without identifying at all which of the two options was being discussed, and some listed a large number of possible advantages/disadvantages rather than concentrate on (and "describe") only three – as required by the question.