THE BCS PROFESSIONAL EXAMINATIONS
BCS Level 5 Diploma in IT

IT Project Management MARCH 2017

Examiner's Report
Section A

Question A1 Syllabus References

Configuration Management

1.10 Project support activities, including configuration management and change control

Question A1

a) Explain the main purpose of using a configuration management system during an IT systems development project.

List and describe the THREE main elements of a configuration management system and explain how they would be used during the project.

(10 Marks)

b) Identify and describe at least FIVE different details held when defining a configuration item.

(7 Marks)

c) There are five stages in a change control system:

- submit the request for change
- investigate and review the request for change
- assess the feasibility and implications of the requested change
- consider the request, and decide whether to accept or reject
- implement the accepted change

i) Identify the people (or groups of people) who should be involved in each of these stages

ii) Identify and explain in which of these stages the configuration management system should be referred to or affected.

(8 Marks)

Answer Pointers

These are based on pages 70 to 78 of the main module text.

a) The main purpose of using a configuration management system during IT systems development is to ensure that the system components and deliverables produced during the system development phase are logged, that their dependencies are identified and that the current status of each is recorded, using version numbers to identify the latest version of each item.

If a change is requested then all the dependencies of the item concerned can be checked during the feasibility assessment stage to assess the extent and implications of the requested change.

If the change is approved then all changed items will be released with a new version number and the item status recorded accordingly.

Up to 5 marks were awarded for a good explanation including the above key points.

The three main elements of a configuration management system (page 77) are:

- configuration item identification
- configuration status accounting
- configuration control

2 marks were awarded for this list, plus up to 3 marks for good explanations of each item.

Total marks 5 + 2 + 3 = 10 marks overall

b) The standard details recorded for a configuration item are usually defined to include:

- a CI reference
- its current status
- its version number
- any larger configurations of which it is part
- any components that it has
- other products that it is derived from
- other products that are derived from it

4 marks were awarded for a list including 5 valid configuration item details plus a further **3 marks** for sensible explanations of the items listed. Total **7 marks.**

c) i) The people involved in each stage could be (see pages 73 - 76)

- submit usually a user or a team member
- review change manager (often the project manager for smaller projects)
- feasibility could be a team member, or an assessment team (larger changes)
- decision normally the project board, though perhaps just the project manager if it is a simple change. Decision-making about changes (within constraints) could be delegated to a change control board
- implement project team (developer), configuration manager

Up to 5 marks awarded (1 per CCS stage) for identifying those involved at each stage

ii) the configuration management system should be referred to at feasibility stage and is then affected (i.e. changed and updated) at the implementation stage

Up to **3 marks** for a sensible explanation, giving **a total of 8 marks**

Examiner's Guidance Notes

This was by far the least popular question in Part A and, worryingly, most candidates who did attempt the question showed a significant lack of understanding of the basic meaning of configuration management and, sometimes, change control.

a) This is standard bookwork, but several candidates described change control here, not configuration management, and others confused this with systems configuration. A change control system facilitates good configuration management.

b) This again is standard bookwork, though dependent on an understanding of the purpose, use and updating of configuration items. Again several candidates listed change control items and types of change here.

c) Part i was usually well answered, but there was a tendency to refer to the change control board in more than one stage (especially the review and feasibility stages); normally this board would only be involved in the decision stage. Sometimes a "configuration management team" was listed without defining such a team.

In many of the Part b answers it was more clear that the underlying purpose and use of configuration management were not well understood..

Question A2 Syllabus References

Project planning

2.2 Use of A-on-N network diagrams, 2.3 Critical Path Analysis, 2.4 Gantt charts

Question A2

Your company's present offices are being closed down and it is moving to a new building nearby. An outline plan for this move has been drawn up with the following main activities.

	Activity	Weeks
A	Inspect the new building, list all required data communications facilities	3
B	Order and deliver all data communications facilities and devices	10
C	Identify, order and deliver replacement PCs, printers, servers and other hardware	8
D	Order and deliver all required office equipment	11
E	Test new hardware with all communications equipment	1
F	Test new hardware with all existing operating and applications soft-ware	2
G	System test all applications and databases on the new hardware	2
H	Move all staff to new premises	1

Tasks B, C and D can all run simultaneously but are all dependent on task A.

Task E is dependent on tasks B and C

Task F is dependent only on task C

Task G is dependent on tasks E and F.

Task H cannot start until tasks D and G are completed.

a) Draw a full Activity-on-Node diagram for this project, showing clearly the earliest and latest start and end dates (as week numbers) and the float, for each node. No start or end nodes are required. Highlight and name the critical path, together with the minimum duration for the project.

(11 marks)

b) The office equipment (task D) takes two weeks longer than planned to be delivered and installed. Identify and explain briefly the resultant changes to the Activity-on-Node diagram and critical path.

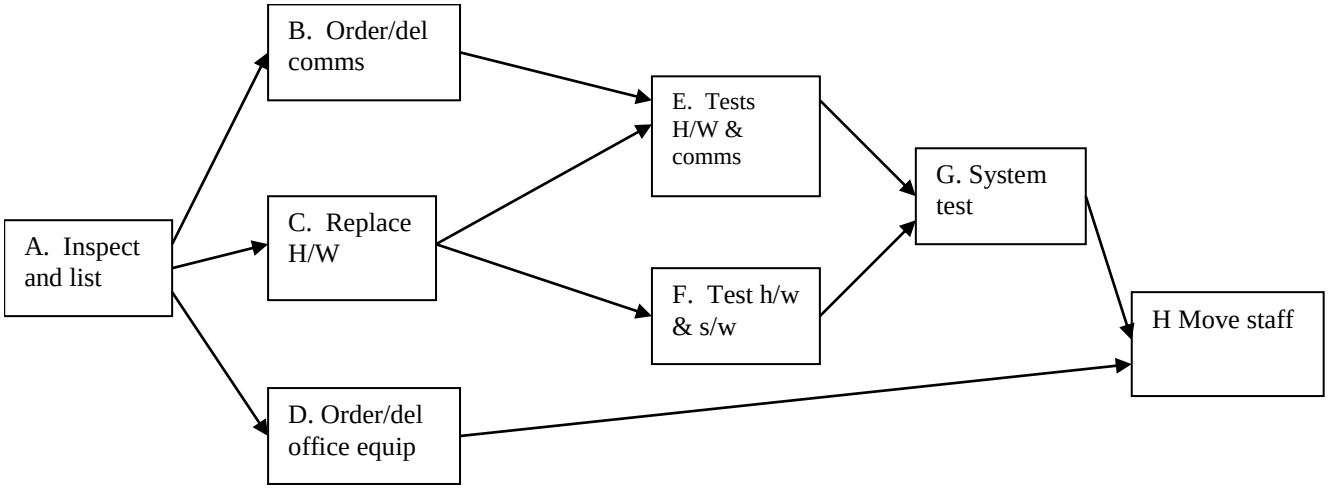
(5 marks)

c) Draw a Gantt chart for the revised project, incorporating the change to task D as defined in Part b. Show all task durations, dependencies, free float and the critical path.

(9 marks)

Answer Pointers

a) The question expected an Activity-on-Node (A-on-N) network diagram outline similar to that below: but with the values set out below shown **within each node** on the diagram, preferably in documented in one of the standard node layouts, such as that on page 42 of the standard text. A good key is also required. The critical path (CP) should be **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 were awarded for:

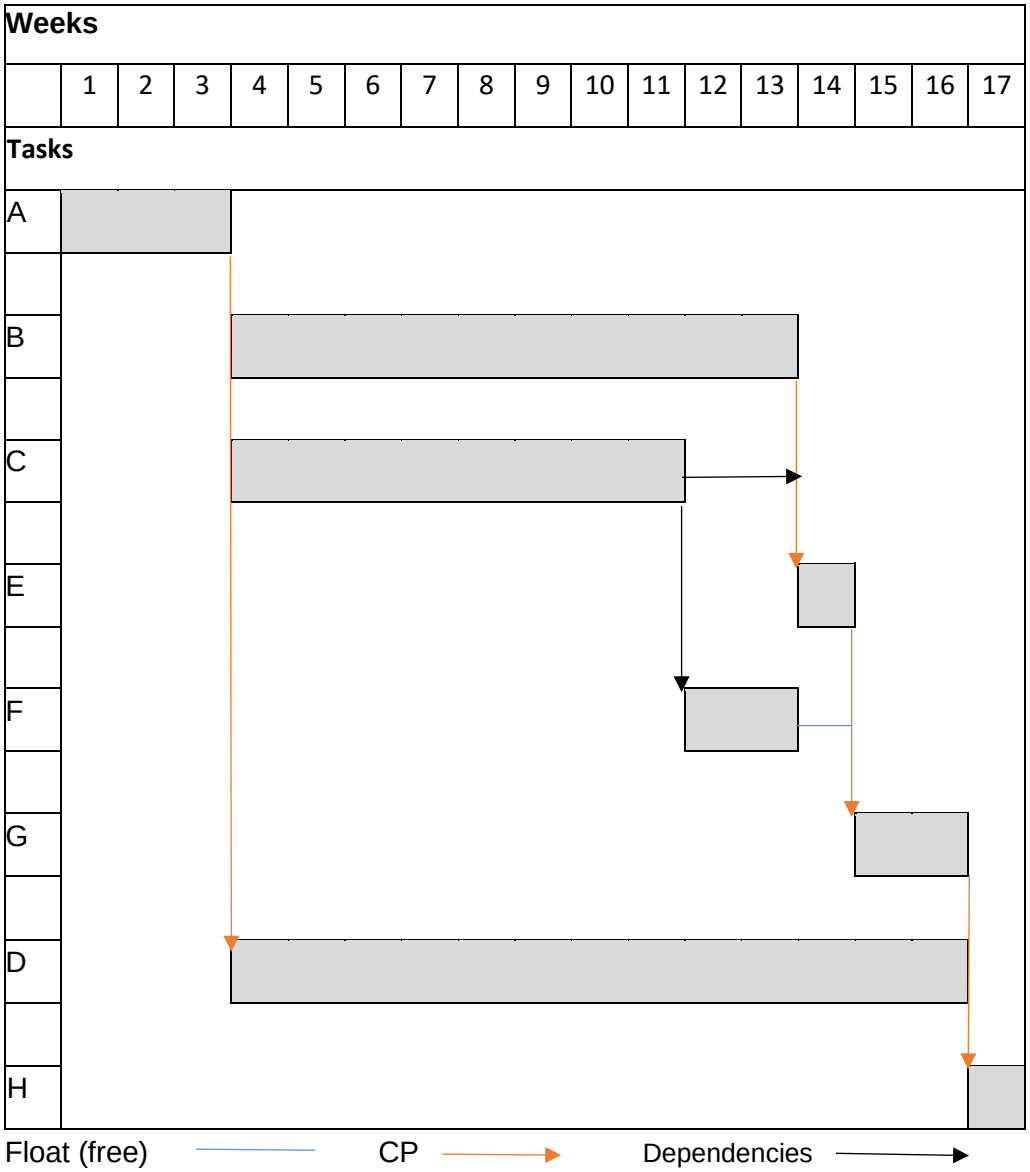
- Clear diagram, good layout and clarity (with all tasks arrowed), correct dependencies
- Node key and correct values
- Highlighting and naming the Critical Path (ABEGH)
- Stating the correct minimum duration (17 weeks)

b) The changes needed to the above network above are new values for Task D, (i.e: LST = 3, EFT = 16, float = 0 and duration = 13), and the addition of a second CP (as the duration of path ADH is now also 17 weeks).

Candidates should realise that these values should always be considered when an A-on-N diagram is changed, and should thus be included in this answer.

5 marks for identifying and **explaining briefly** all of these changes.

c) The question expected a Gantt chart similar to:



This should be well scaled and structured with correct task durations and show clearly all dependencies, float **and highlight the two** critical paths. A key is also very helpful.

Up to **9 marks** were awarded here with (usually) 1 mark deducted for each clear omission.

Examiner's Guidance Notes

This question was very popular though not quite as popular as A3. Overall it was answered very well, but the usual errors still arise with some candidates.

a) In particular in Part a): drawing an Activity–on-Arrow rather than A-on-N diagram, not providing well-structured nodes and deriving the critical path and minimum duration through trial and error rather than calculating the backward pass values.

Note also that the concept of total float and free float is not really relevant to an A-on-N diagram. Several candidates tried to show both values in their Node layouts, which is incorrect, as the A-on-N Node values are always free float only. (See the Node definitions on page 42).

Another error was an incorrect backward pass calculation of the LFT for task C. This should be 12 (dictated by the LST of task F), not 13. This led to an incorrect float for task C.

Candidates were expected to highlight the critical path on the A-on-N diagram. Many omitted this and others showed it as an extra wavy line with the CP Nodes ringed – resulting in an over-complicated diagram. The best method here is simply to embolden the existing dependency arrows.

b) This was usually answered sensibly, but the second CP was sometimes not identified and several answers did not give any explanation.

c) The overall standard of drawn diagrams was not as good as in previous years. Many had vertical lines down to the x-axis at the start and end of every task- which made it difficult to identify dependencies clearly. The second CP was often not highlighted and free float, which was required here, was often omitted or shown incorrectly.

In a few answers all tasks were given a start week of 1 for which no marks were awarded

Question A3 Syllabus References

Human factors

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

Question A3

a) IT project managers are expected to possess certain skills or attributes. Describe FOUR skills (things they can do) or attributes (characteristics they possess) of good IT project managers.

(8 marks)

b) IT project managers can employ a number of management styles. Two such styles are known as 'autocratic', which is often preferable when most of the project staff are new to a project, and 'democratic', where most of the staff are more experienced. Discuss the advantages and disadvantages of each of these management styles.

(10 marks)

c) An IT project has been running well for 6 months. The IT project manager then notices a decrease in the efficiency and performance of the project team. Describe the steps they could take to deal with this situation.

(7 marks)

Answer Pointers

Based on pages 136, 143-4 of the module text.

a) Such skills or attributes can usually fit into the following categories:

- Leadership, including representing the project in and outside the organisation
- People skills (including negotiation, delegation, motivation)
- Managing, including planning, controlling and monitoring
- Technical skills & knowledge

These are expanded on page 136 of the standard text.

2 marks were awarded for each skill/attribute described. Total **8 marks**

b) The advantages and disadvantages of these two management styles ("autocratic" and "democratic") are described on page 143.

They might be summarised as:

	Advantages	Disadvantages
Autocratic	Clear direction Quick and Decisive Firm Provides guidance to staff Leader may be most capable/knowledgeable technically	Could be bullying Uncaring Remote Unapproachable Over-bearing Can demotivate team (especially when experienced) Team knowledge/ experience may be under-utilised
Democratic	Shares responsibility for decision-making and performance Improves team commitment	Staff may not be provided with necessary guidance and direction, particularly in new circumstances. Differing opinions about directions and approaches. Can be seen as weak or avoiding responsibility Difficult to impose discipline when needed

Up to **5 marks** for a clearly identified and well-argued discussion of each of these two sets of advantages and disadvantages. Total **10 marks**.

c) Possible steps that can be taken here:

1. Identify any root causes –for example by observing or interviewing. Check that there was really a dip in efficiency – how was that identified?
2. Identify a range of possible solutions - ruling out any exceptional conditions such as a bout of sickness or a public holiday
3. Choose a course of action - having assessed the impact of this in terms of cost and delays. Sometimes it might be a quick solution. Sometimes you may need to take time out to tackle deeper issues. It maybe that it is too expensive to fix.
4. Implement the chosen course of action and understand any possible negative impacts. For example, will a pay rise for some cause disharmony for everyone else?
5. Evaluate the effect of the course of action on the efficiency. Did it fix the problem identified?

Two marks were awarded for a sensible brief discussion of each step identified and ordered, with a maximum of **7 marks** in total.

Examiners' Guidance Notes

As noted above this was the most popular question in Section A. However, relatively few candidates answered all three parts well.

a) This question required an analysis of the type of person who might make a good project manager; it did **not** ask for a list of the main **tasks** that a project manager would be expected to undertake (such "define project scope" or "select team").

Many answers focussed on elements of risk management rather than a wider consideration of good project management. Many answers also listed/described 8 skills/attributes rather than the required 4.

b) This part required a comparison of the two very different styles of management. Many candidates assumed that that the project teams would be either new to a project or more experienced and then compared the needs of each type of project team (such for training or closer supervision). These are related more to project management tasks than project management styles.

c) The key point here is that the project manager needs to investigate the likely cause(s) of this decrease in efficiency and performance before considering the various actions that might be

taken. Some candidates did not put the necessary steps to do this in the correct order. Many answers discussed various possible solutions without considering whether they would be appropriate in this instance.

Section B

Question B4 Syllabus References

Stages of a project

1.4 Stages of a development project: requirements elicitation, analysis, design; system building and integration. Verification and validation.

Question B4

a) The System Development Lifecycle (SDLC) for IT products consists of a number of individual processes. These can become the stages of a project.

Explain any FOUR SDLC processes and the products or outcomes expected from them.

(20 marks)

b) Describe the difference between the verification and validation processes in the development of a software product.

(5 marks)

Answer Pointers

a) Authorities have identified as many as 10 processes in an SDLC. Any four processes were needed from a list that might include initiation, system concept development, planning, requirements analysis, design, development, integration and test, implementation, operation and maintenance, disposition. Other names for these processes were acceptable. Outcomes of the selected processes were then needed, for example, the sanctioning of project development as the result of a feasibility study in the initiation process, the project scope as an outcome of concept development, terms of reference from planning stage, requirements could be derived from interviews, observation of practices, documentation analysis in the requirement analysis stage. Further outputs can be found at pp 10-12 of the main module text. Some candidates adopted a system model drawn from a life cycle such as a waterfall model with a slightly restricted range of processes going from requirements to implementation. Explanations of these products or outcomes from each process were needed to attract further marks.

1 mark was awarded for naming a process and a further 1 mark for the corresponding outcome with a further 3 marks for an explanation of process and products/outcomes.

b) The difference between verification and validation has been summarised by Boehm as verification being the question *'are we building the project right?*' while validation is *'are we building the right project?*'. The candidate needed to distinguish that validation was based on requirements checking whereas verification was about whether code was correctly implementing a given function and involved code checking.

5 marks were given for full correct description and 2 marks for correct description of just one.

Examiner's Guidance Notes.

This question offered candidates an opportunity to approach the topic from several perspectives using systems that were familiar to them. This question was the most popular in Section B with approximately 84% of candidates attempting it.

Part a proved difficult for many with a number of answers simply listing the software development life cycle processes (in full) ignoring the requirement of the question to provide only FOUR. Many candidates were able to gain marks for naming and a further mark for a basic description but could not add further explanation of the process outcomes, subsequently failing to achieve half of the available marks for this question.

Part b had a surprisingly large number of candidates unable to gain any marks at all. It was evident that many had not paid attention to the question which was concerned with the development of a software product. This meant many candidates failed to gain any marks for this part. Many answers to Part4 (b) also showed the application of rote learning, with the well-known quote from Boehm being attached to the end of a confused and incorrect description of the differences between the processes.

Question B5 Syllabus References

Software Quality Management

6.2 ISO 9001 and quality management systems: principles and features.

6.3 System quality specification and measurement, including an overview of ISO 9126

6.6 Methods of enhancing quality: reviews.

Question B5

a) Software product standards such as ISO 9126 and ISO 25010 refer to six external quality characteristics. Describe any FOUR of these characteristics.

(12 marks)

b) The ISO 9001 quality management system is based on eight principles. Describe any THREE ways this standard differs from the ISO 9126 approach.

(9 marks)

c) In the early stages of project development software defects can be detected using a range of review techniques. Name any TWO of these techniques.

(2 marks)

Answer Pointers

a) 1 mark was awarded for each of four quality characteristics from functionality, reliability, usability, efficiency, maintainability, portability. Up to further 2 marks were awarded for each correct description, for example that reliability related to the software's capability to maintain correct running, that portability was the ability to transfer between environments, and maintainability was *'a set of attributes that bear on the effort needed to make specified modifications*'. The standard 9126-1 has an update which some candidates might have referred to (ISO 25010) in which case the additional characteristics of compatibility and security were acceptable.

b) ISO 9001 is a quality management system and relates to the quality of organizational processes whereas ISO 9126 relates specifically to software product quality. Any three from the following (taken from the ISO 9001 standard) would gain marks

- Customer focus: Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations
- Leadership: Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.
- Involvement of people: People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.
- Process approach: A desired result is achieved more efficiently when activities and related resources are managed as a process.
- System approach to management: Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.
- Continual improvement: Continual improvement of the organization's overall performance should be a permanent objective of the organization.
- Factual approach to decision making: Effective decisions are based on the analysis of data and information.
- Mutually beneficial supplier relationships: An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

c) Any two techniques would attract marks from a list that included.desk checking, document review, peer review, inspection, walkthrough, pair programming and static testing.

Examiner's Guidance Notes

This question was the second most popular in section B of the paper. 45% of candidates attempted it with approximately half of the candidates achieving a pass mark.

For Part a, in general candidates gave four characteristics of the standards with few showing difficulty in understanding that the standards were about the external quality measures of software products. However many candidates failed to gain additional marks by attempting more than a cursory description.

Part 5(b) ws about the standards of the organisational processes (not the software development process per se). In general candidates showed awareness of the context of the standard and were able to describe the principles – often reciting up to eight of the principles. Once again a defect was not paying attention to the question which was to describe THREE ways in which the principles differed from ISO9126.

Part 5(c) proved unexpectedly difficult for a majority of candidates who were not able to name two review techniques. Many once again did not read the question correctly and cited testing techniques not appropriate to the early stages of project development.

Question B6 Syllabus References

Project planning and estimating

2.6 Agile approaches to planning: the use of time-boxing; product and sprint backlogs; Prioritisation of increments (MoSCoW rules).

Question B6

a) Explain ways in which an agile approach differs from other approaches to software development projects.

(12 marks)

b) Briefly explain any one of the MoSCoW rules which are used in the prioritisation of increments in an agile development project.

(4 marks)

c) Explain the way in which increments (or sprints) are used in task planning in an agile based project.

(9 marks)

Answer Pointers

a) Agile approaches emphasise intense periods of development using various methods that can focus on teams using methods such as Scrum which incorporate incremental development in sprints, or practices such as eXtreme Programming which focus on high expertise and paired programming, peer review and instant checking. Traditional practices, such as the waterfall method, have a more rigid stepwise process. An agile approach calls for a less bureaucratic way of working and the use of iterative and incremental approaches.

. 2 marks were awarded for each key area identified, plus a further mark for each comparison point.

b) This question tests understanding of the way an incremental project is able to prioritise requirements within known (time-boxed) constraints, using the 'MoSCoW' framework.

'Must have', 'Should have', 'Could have', 'Won't have' are classifications in agile development that assist in requirements prioritization. Candidates had to name a classification to obtain 1 mark and describe how it could be used to classify the importance to users of having a particular requirement delivered within a specified time box for a further 3 marks. An answer which simply restated what the classification label was only attracted 1 mark. Full marks required an explanation of the time context that MoSCoW operates within and the rules that allow the relative importance of a requirement within the time box to be allocated.

- **Must have**. Requirements labeled as MUST *(Minimum Usable SubseT)* are critical to the current delivery time box for it to be counted a success. If even one *MUST* requirement is not achieved, the project delivery should be considered a failure.
- **Should have**. These requirements are important but not necessary for delivery in the current delivery time-box. While should requirements might be as important as Must have, they are often not as time-critical or there may be another way to satisfy the requirement, so that it can be held back until a future delivery time-box.
- **Could have**. Requirements labeled as could are desired though not necessary. These might be included if time and resources permit.
- **Won't have**. These requirements have been agreed by stakeholders as the least-critical. As a result, they are not planned into the schedule for the delivery time-box. These requirements are either dropped or reconsidered for inclusion in future time-box periods

c) Sprints are developer group based, encourage team work and cooperation in achieving agreed tasks. Sprints are typically 2-4 weeks in duration.

Planning work in a sprint follows the general form:

- The sprint team select requirements items from the product backlog (User requirements)
- Examine then select items which can be done in a single sprint
- Prepare sprint backlog detailing items selected from product backlog
- During initial preparation time box (standard 4 hrs for 2 week sprint) agree with user representatives what items can be done in a sprint
- Commit the agreed tasks needed to do selected product backlog item to the sprint backlog
- Perform the tasks in the agreed time-box of the sprint.

Candidates should show knowledge of the basic use of a sprint in team agreeing work content thus enabling the planning of work to an agreed timeframe for 3 marks. For showing knowledge of product backlog selection could gain a further 3 marks and construction of sprint backlog 3 marks.

See Hughes and Cotterell pp 280-281. Pp 92-95. Cadle & Yeates pp76-82. Hughes p 17. Wysocki CH 10

Examiner's Guidance Notes

This question was the least popular in Section B and achieved the lowest overall pass rate for this section. It was evident that many candidates selected the question as the last choice in the paper with many one line answers! For those candidates making a serious attempt the answers generally exhibited a lack of exposure to agile methods in a management context.

Part 6(a) showed many unable to explain the differences between agile and other approaches. Candidates tended to show understanding of agile methods being dynamic and intense and traditional approaches being more rigidly structured. However many answers focused on a single example of an agile approach with a comprehensive account of the traditional approach limiting the available marks by not including further key areas from the agile approach.

Part 6(b) showed a fairly comprehensive lack of knowledge about prioritising in an agile methodology. Only a few answers demonstrated direct knowledge of the MoSCoW rules with very few attempts able to explain a single rule.

Part 6(c) asked for further detail concerning agile task planning. Given the poor attempts from 6(b) it wasn't surprising to see that few were able to even attempt this part of Question 6. Those who did generally gave poor answers with the usual few notable exceptions giving a good answer.