Question A1

Learning outcomes

4. Explain the procedures needed to monitor, control and report upon an IT development project

The question

a) i)   Explain how tolerances can aid the control of projects.

(4 marks)

ii)   Describe SIX items that should be included in a regular progress report to the project sponsor.

(6 marks)

b) Planning and monitoring are the first two steps in performing project control. Explain the steps that follow.

(9 marks)

c) On a large project, control is often achieved by the use of stages. The project sponsor will make key decisions at the end of a stage. They might also decide to hold an assessment of the project within the actual stage. Describe THREE situations or conditions which would lead to a project assessment during a stage

(6 marks)

Answer Pointers

(a)   i)   Explain how tolerances can aid the control of projects.   (4 marks)
Tolerances aid the control of projects by

- B
  eing set by those responsible for the project
- P
  roviding early warning of set-backs in progress and possible cost over-runs
- A
  llowing time to bring the project back on track
- S
  upporting exception reporting

ii)   Describe SIX items that should be included in a regular progress report to the project sponsor.   (6 marks)
Among the items that could be included are:

- Project Identifier and date
- Period covered
- Current budget and schedule status
- Products completed during the period

- Problems encountered or anticipated
- Products scheduled to be completed during the next period
- Total of requests for change approved
- Budget and schedule impacts of the changes

b) **Planning and monitoring are the first two steps in performing project control. Explain the steps that follow.** **(9 marks)**

The steps would normally be:

3. Acting/Deciding
4. Evaluating
5. Re-planning

Each of the three steps would need to be explained to obtain full marks.

c) **On a large project, control is often achieved by the use of stages. The project sponsor will make key decisions at the end of a stage. They might also decide to hold an assessment of the project within the actual stage. Describe THREE situations or conditions which would lead to a project assessment during a stage** **(6 marks)**

Project assessment during a stage could occur:

- If the project manager has created an exception report
- If there are significant requests for change
- If work on the next stage needs to be brought forward
- If the stage has been extended into a long one and a review is now further away.

Examiner Guidance

a) i) Many students related the word 'tolerance' to managing people e.g. the project manager had to be tolerant of people. Overall few students gained marks for this answer.

ii) Many candidates described stage reports or project meetings. The question was specifically about regular progress reports. These differ from both exception reports and stage reports. The exception report is prompted by a forecast deviance from the plan and deals with actions for bringing the project back on track. The stage report is focused on the completion of identified products and planning for the next stage. A regular progress report is routine and therefore focused on a period of time.

b) The control cycle is often referred to as a virtuous circle because it returns to planning. Many candidates simply talked about planning and monitoring as these had been given. There were three marks each for the three subsequent steps (3,4,5). It was not essential that the same words were used to describe these steps and marks were awarded for answers that described the process but used different words such as review for evaluate. Some candidates used the risk process or testing as a vehicle for explaining the process and where all three aspects were covered full marks were awarded.

c) Answers that included reasons such as 'the project owner might want to check up on things' or ' because there is a change to something' scored low marks. Mid-stage assessments are not undertaken lightly. Progress checks can provide the project owner with confidence that everything is on track and change control can deal with a request for change. This question sought out the exceptional conditions that would require a mid-stage assessment.

Question A2

Learning outcomes

1. Explain the stages in the system development life cycle and activities that are carried out to implement an information system.

   Feasibility studies and the establishment of a business case for a project

2. Apply basic project planning techniques

   Different estimating techniques

The question

   a) Costs and benefits are two essential sections within a business   case.
       List FIVE other sections in a business case.

   (5 marks)

   b) List FIVE categories or types of benefits that are associated with an IT project and provide an example for each one.

   (10 marks)

   c) List FIVE estimating techniques that can be used to identify costs.
   (5 marks)

   d) There are some projects that will be given approval even though the costs exceed the benefits in the business case. Describe ONE example of when this might be legitimate.

   (4 marks)

Answer Pointers

 a)   Costs and benefits are two essential sections within a business case. List FIVE other sections in a business case.

   (5 marks)

Other sections of a business case report include:
* Management summary
* Description of the problem or opportunity - link to the corporate strategy
* Options/alternatives
* Risks and assumptions
* High level plan

 b)   List FIVE categories or types of benefits that are associated with an IT project and provide an example for each one.   (10 marks)

Types of benefit could include
* Financial - reduce costs, identifying new revenue,
* Operational - upgrades, increase productivity, sharing assets, standardising
* Customer - managing customer relationships, providing better access,
* Internal Management - improved decision making, allocating resources, identifying problems
*   Strategic – the IT project may not create benefits directly, but enable other projects to generate benefits

 c)   List FIVE estimating techniques that can be used to identify costs

   (5 marks)

These might include:
*   Delphi
*   Analogy
*   Parametric - LoC, CoCoMo , Function Point,

- Bottom up
- Standard product

d) **There are some projects that will be given approval even though the costs exceed the benefits in the business case. Describe ONE example of when this might be legitimate.**

(5 marks)

For example:
- Regulatory change, the project must be done even though it provides no direct benefit to the company.
- Upgrades, some IT vendors won't support old versions.
- Date/Temporal issues eg Y2k, the systems will stop working unless this issue is tackled
- Internal reorganisations, IT projects are often commissioned to support reorganisations.

Examiner Guidance

a) On the whole this question was answered well and where it wasn't it was because candidates focused their answers on costs and benefits, which were explicitly ruled out from the answer.

b) Most answers were about things that would help a project succeed for example 'establishing a good team' or about secondary benefits such for example 'doing a project well will lead to a good reputation that will help win more business'. However, we do not do IT projects to make a good team or to get a good reputation. The idea of a benefit is linked to the reason 'why' we do a project. Though the model answer is listed above some answers were structured around other categories such as quantitative and qualitative and financial/non-financial. These answers still attracted some marks as they were clearly categories of benefits.

d) The occasions when you would proceed with a project even though there was no positive business case would be when you are forced to, that is, you wouldn't choose to the project but you have little or no choice.

Question A3

Learning outcomes

3. Demonstrate an understanding of steps needed to build and maintain effective development teams.

Project organisation: roles…

Team-building theory and practice

The question

a) Draw a standard project organisation chart/structure. **(4 marks)**

b) Which human or personnel theories would be the most useful in creating a project team? Justify your choice. **(8 marks)**

c) i) Who is responsible for project success: the project manager or the project executive? **(1 Mark)**

ii) Justify your choice by describing THREE responsibilities of the project manager and THREE responsibilities of the project executive.

(12 marks)

a) **Draw a standard project organisation chart/structure.** **(4 marks)**

Answer Pointers

The chart should show Project Manager, Project Executive, Project Board where it consists of more than just the Project Executive (e.g supplier, user representatives) Project Support, Project Assurance, Project Team

b) **Which human or personnel theories would be the most useful in creating a project team? Justify your choice.** **(8 marks)**

Answer Pointers

The focus must be on creating a team. Marks were awarded for aspects of a theory or theories (e.g. those of Belbin or Tuckman) directly related to team creation.

c) i) **Who is responsible for project success: the project manager or the project executive?** **(1 Mark)**

   ii) **Justify your choice by describing THREE responsibilities of the project manager and THREE responsibilities of the project executive.**

   (12 marks)

Answer Pointers

(i)The candidate had to clearly state either project manager or project executive to gain a mark.

(ii) The table below identifies some possible responsibilities.

Project Manager	Project Executive
• Generally speaking, the PM is looking into the project at issues such as cost, time, quality and the project team. • Mostly concerned with control and reporting.	• Generally speaking the PE is looking out from the project at the wider business and external environment. • Mostly concerned with assessing and deciding.
• Collecting information about costs/progress to present reports.	• Assesses viability by considering the cost, time, quality in relation to the original benefits and makes decision to continue.
• Making forecasts about future costs / progress and reporting exceptions.	• Securing resources for the project
• Identifying risks and proposing responses	• Assessing the external environment / wider organisation for changes/risks
• Collecting and processing change requests	• Makes decisions about requests for change / risk responses from the project
• Taking action within boundaries set by Project Executive.	• Planning for benefits realisation

Examiner Guidance

a) Many candidates scored well on this question but others lost marks for drawing an organisation chart for a company rather than a project. Some candidates decided not to draw a chart and instead list key roles. This attracted no marks as the question clearly stated the requirement to draw a chart.

b) No marks were awarded to answers that failed to mention a recognised theory, such as Belbin or Tuckman/Jensen. Half marks were awarded for a good description of one or more of these theories but full marks could only be gained to directly relating the theories to the process of creating a team. For example Tuckman/Jensen describes stages of team formation. Understanding these stages could help the project manager tailor thier actions and decisions to make them appropriate for the stage the team is in.

c) On the whole this question was not answered well. This could be because of a misunderstanding about what the project executive was. Many candidates described the project executive as someone who worked for the project manager. The project executive is a member of the project board. Some people label this role as project owner or project sponsor.

Question B4.

Learning outcomes

6. Explain the ways in which appropriate quality attributes of the products of an IT development project can be assessed and assured.

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

> Quality assurance and control…

> Methods of enhancing quality: the different types of testing. Inspections, reviews and standards

The question

a) The phrase 'fitness for purpose' is often used when assessing the quality and suitability of a new IT system. The international standard ISO 9126 sets out six standard characteristics by which software quality can be measured. List and explain briefly FIVE of these six characteristics. **(15 marks)**

b) Explain briefly the difference between quality assurance and quality control, giving an example of each. **(6 marks)**

c) List and explain briefly FOUR different quality control activities that can be used to identify and remove quality defects BEFORE the project reaches the testing phase. (**4 marks)**

Answer Pointers

a) **The phrase 'fitness for purpose' is often used when assessing the quality and suitability of a new IT system. The international standard ISO 9126 sets out six standard characteristics by which software quality can be measured. List and explain briefly FIVE of these six characteristics. (15 marks)**

ISO 9126 includes six standard characteristics:
  * functionality
  * reliability
  * usability
  * efficiency
  * maintainability
  * portability

  Five of these six were required.

1 mark awarded for each of these items named correctly (or an acceptable synonym), plus 2 marks each for good explanations = total **15 marks**

b) **Explain briefly the difference between quality assurance and quality control, giving an example of each.** **(6 marks)**

Quality control*:* the focus is on checking the products created by the project/system and eliminating or reworking those that are defective.

1.5 marks.

Examples: checking acceptance test cases against the requirements document to ensure that all the required functions in the new software product will be tested; acceptance testing to ensure delivered software meets its requirements.

1.5 marks

Quality assurance*:* the focus is on checking that the appropriate quality control processes are being carried out effectively. 1.**5 marks**

Examples: checking acceptance test documentation to see that the execution of all test cases has been carried out and suspected errors have been recorded; checking that there is a record of errors having been dealt with fully.

1.5 marks

Total = **6 marks**.

c) **List and explain briefly FOUR different quality control activities that can be used to identify and remove quality defects BEFORE the project reaches the testing phase.** **(4 marks)**

The 'defect removal' activities that could take place before the testing phase can include:

- desk checking
- document review
- peer review
- inspection
- walkthrough
- static testing

Up to 2 marks for naming 4 of these items, named precisely, plus up to 2 more marks for good explanation of each. **= total 4 marks.**

Examiner Guidance

Overall this question was not answered well, with a significant number of candidates not attempting part (a) which is really standard 'bookwork' and worth 15 of the 25 marks for this question.

a) Many of those who did answer this part showed little, if any, knowledge or understanding of ISO standard 9126 and its intent, sometimes confusing it with other standards. Those who did know the standard usually understood it well and gained very good marks. Descriptions of maintainability (i.e. modifiable as well as correctable) in particular were sometimes incorrect.

b) Many candidates relied (solely) on a form of comparison chart or table for this answer. This did not answer adequately the question – which was to **explain** the difference between the two concepts. Good answers should concentrate on what these two concepts are and their main focus, rather than who should undertake them or whether they might be within or outside the project budget.

Very few answers included any valid examples, which perhaps indicates a lack of understanding of the correct meaning of both.

c)   The essential part of this question was to focus solely on quality activities that could be used to remove quality defects **before** testing starts. Far too many answers listed various types of program and system testing. Again there was a tendency to list, rather than explain.

Question B5

Learning outcomes

2. Apply basic project planning techniques

       Use of (activity on node) precedence plans and network analysis

       Gantt charts

The question

A small research organisation is extending its operation and database systems to cover the whole country.   This will require extended software, additional equipment and more staff – all to be based mainly in the existing offices.

The outline plan for this rapid growth includes the following main tasks:

	Activity description	weeks
A	Confirm the hardware sizing for the extended requirements, the software changes, the number of new staff and the additional equipment required for them	3
B	Order, deliver and install all additional computing and communications equipment	10
C	Modify and extend all software for additional functionality	8
D	Recruit and train new staff	11
E	Capacity testing of extended software on enhanced hardware and communications equipment	1
F	Functional testing of all extended software	2
G	Full acceptance testing all extended software on new hardware;	2
H	Implement fully the extended systems.	1

Tasks B, C and D can all run simultaneously but all are 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, 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.   **(9 marks)**

b)   The staff recruitment and training (task D) takes two weeks longer than planned to be completed. Identify and explain briefly the resultant changes to the activity-on-node diagram and critical path.   **(3 marks)**

c) Draw a Gantt chart for the revised project, incorporating the change to task D as specified in part (b). Show all task durations, dependencies, float and the critical path**. (7 marks)**

d) Identify and explain TWO advantages of using a Gantt chart in comparison with an activity-on-node network diagram, and TWO advantages of using a network diagram when compared with a Gantt chart. **(6 marks)**

Answer Pointers

a) Draw a full activity-on-node diagram for this project, showing clearly the earliest and latest start and end dates, 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. (9 marks)

This expected an A-on-N network diagram similar to:
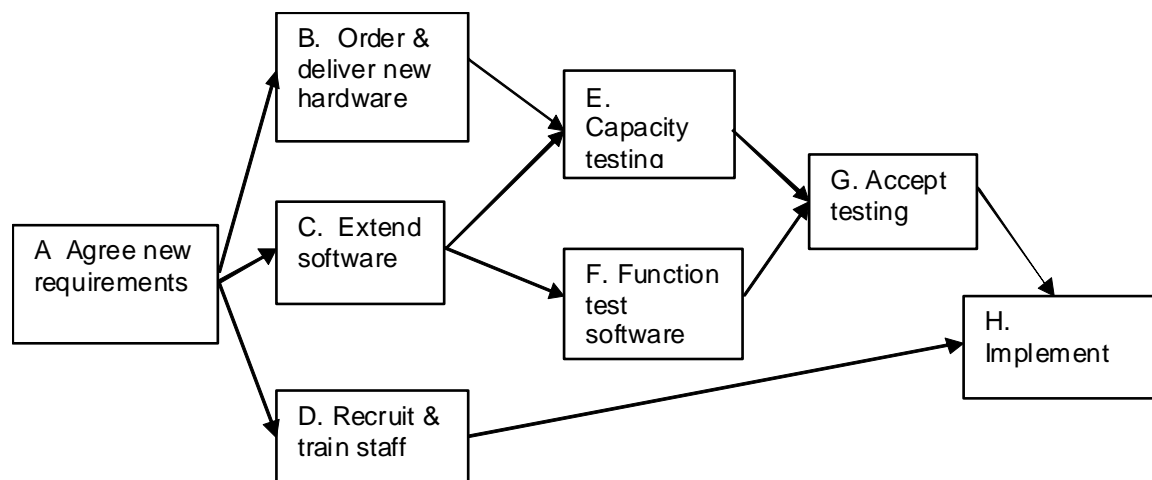
with the following values (in weeks) shown within each node on the diagram, using one of the standard node layouts (if a good key was supplied also then a bonus mark was awarded here), *and* the critical path *highlighted* clearly on the diagram

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

Marks**:** Diagram, layout and clarity   3 marks
Values (as above)   3 marks (2 if not on the diagram)
Highlight and name the Critical Path (ABEGH)

Minimum duration (17 weeks)   1 mark   total   **= 9 marks**

**b)** **The staff recruitment and training (task D) takes two weeks longer than planned to be completed. Identify and explain briefly the resultant changes to the activity-on-node diagram and critical path.   (3 marks)**

The only changes to the above diagram are to the values:
- LST (3), EFT (16), float (0) and duration of task D   2 marks
- Addition of a second CP (as ADH is now also 17 weeks)   1 mark
                                          total   **= 3 marks**

c) **Draw a Gantt chart for the revised project, incorporating the change to task D as specified in part (b). Show all task durations, dependencies, floast and the critical path.   (7 marks)**

This expected a Gantt chart similar to:

Weeks

| 1 | 5 | 10 | 15 | 17 |

A
B
C
E
F
G
D
H
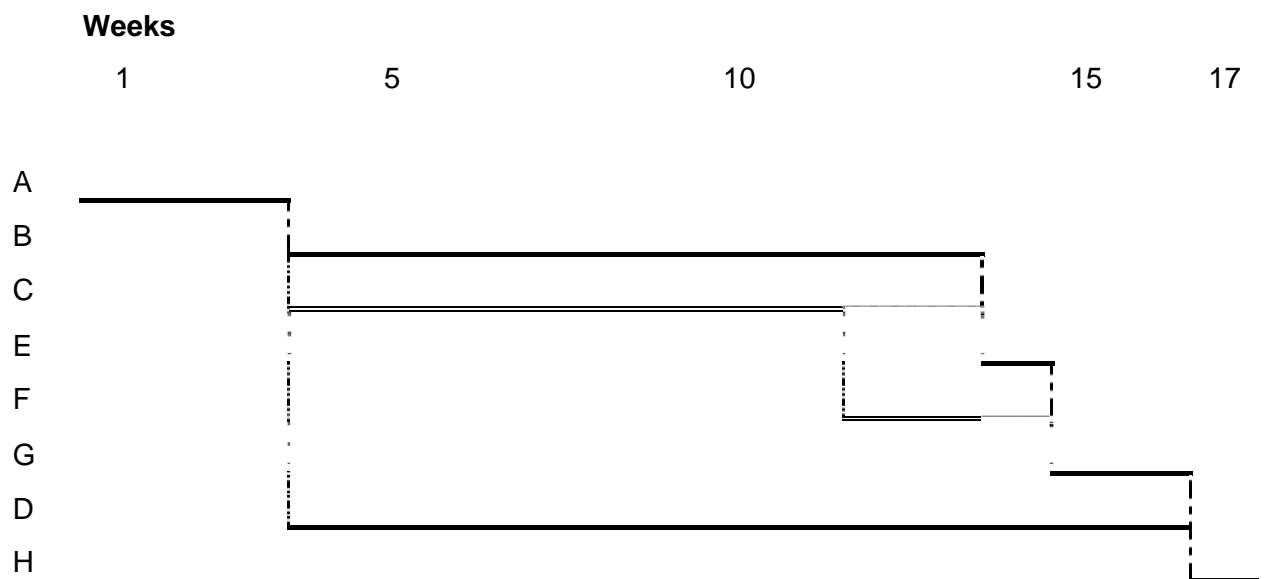
Task ─────
Float ─────
CP ─────

This should be well scaled with correct task durations, show clearly all dependencies, float and highlight the two critical paths.

(usually 1 mark deducted from the maximum of 7 for each clear omission)

Up to **7 marks** awarded.

d) **Identify and explain TWO advantages of using a Gantt chart in comparison with an activity-on-node network diagram, and TWO advantages of using a network diagram compared with a Gantt chart.   (6 marks)**

Standard Gantt advantages are usually:

- easier for senior management to understand
- timescales are shown more clearly
- progress can be shown more simply
- better for resource allocation

Standard Activity-on-Node advantages usually include:

- displays all values for each task
- shows dependencies more clearly
- easier to re-work if there is a change in duration or dependency

Only two of each set of comparative advantages were requested, with a good explanation of each one.

1 mark (per set) for just naming two advantages in each set, with a further 2 marks per set for the explanations.   total = 6 marks

Examiner Guidance

This was by far 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 (with very few A-on-A diagrams this time, which was quite encouraging). 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). Other frequent problems included the calculation of EFT and LFT and float, diagrams with no 0 float nodes (although a correct critical path was still stated), failure to highlight the critical path and, sometimes, to state the minimum duration (in weeks). Occasionally the duration of the shortest path was quoted, not the duration of the 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 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.

d) Not well answered. Many candidates produced lists of well over 2 advantages in each of the two comparisons (A-on-N v Gantt, then Gantt v A-on-N). Sometimes the same advantage appeared in both lists. Such instances were penalised. Frequently no explanations were provided at all.

Question B6

Learning outcomes

4. Explain the procedures needed to monitor, control and report upon an IT development project.

Project support activities, including configuration management and change control.

Assessment of implications and impact on the project of deviations and changes to the project plan.

The question

a)   Explain the main purpose of using a configuration management system:
   i)   during an IT systems development project;
   ii)   after the system has been installed, when further software maintenance will need to be undertaken.

List and describe the THREE main elements of a configuration management system, and explain how they would be used during the project development phase (i) above.   **(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
   - review the request for change
   - assess the feasibility 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

a)   Explain the main purpose of using a configuration management system:
   i)   during an IT systems development project;
   ii)   after the system has been installed, when further software maintenance will need to be undertaken.

List and describe the THREE main elements of a configuration management system, and explain how they would be used during the project development phase (i) above.   (10 Marks)

During the project development phases configuration management can be used to ensure that the components and deliverables are logged, their dependencies identified and 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 will be checked during the change feasibility assessment stage to assess the extent and implications of the requested change.

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

After project implementation configuration, management is equally useful as it can be used to ensure that post-implementation changes are evaluated fully (similar to the feasibility assessment above, to include any effect on other dependent systems), and the progress and effect of such changes fully recorded.

Up to 5 marks for a clear well-argued explanation differentiating between development and post-implementation

The three main elements of a configuration management system are:

- configuration item identification
- configuration status accounting
- configuration control

2 marks for a correct list, with up to 3 marks for explanations. Total **= 10 marks**

b)   Identify and describe at least FIVE different details held when defining a configuration item.   (7 Marks)

4 marks for a list of 5 valid configuration item details, from:

- CI reference
- Current status
- 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
- Others could include dates

3 marks for sensible descriptions of these 5 selected items. Total = **7 marks**

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

- **submit the request for change**
- **review the request for change**
- **assess the feasibility 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)

i)   Those involved in each stage would usually be:

submit	a user or a team member
review	change manager
feasibility	assessment team
decision	project board, perhaps project manager if a simple change
implement	project team (developer), & configuration manager

However allowance was made for slight differences throughout provided these were reasonable within the context of an overall projects team. Up to 5 marks

ii)   T
he configuration management system is referred to at the feasibility

Examiner Guidance

This was very much the least attempted question in Section B. Overall, the true meaning and structure of a configuration management system were understood poorly. The concept was often confused with other system and hardware configuration topics.

a) There are two aspects to the use of configuration management during the development phase: recording progress and evaluating/recording change requests. The second was often omitted; the key point of checking dependencies was rarely mentioned.

The three main elements were not widely known correctly, with explanations that (if provided) were often completely incorrect.

b) Again several candidates submitted a list of headings, with little or no description. The dependency aspects of a configuration item were usually not mentioned, or described, at all.

c) These are the 'standard' stages of a well-structured change control system and were usually understood within the context of the question, though quite frequently the (initial) review was confused with the feasibility evaluation stage. There was a tendency not to distinguish clearly between the specific involvement, work and responsibilities required at each stage.