BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

IT PROJECT MANAGEMENT

EXAMINERS REPORT

Friday 2nd October 2015

Answer **any** FOUR questions out of SIX. All questions carry equal marks

The marks given in brackets are **indicative** of the weight given to each part of the question.

Only **non-programmable** calculators are allowed in this examination.

Section A

Question A1

a) List FIVE techniques for obtaining requirements. **(5 marks)**

b) Once the user requirements are known you have a choice between buying an off-the shelf package (OTS) and building a new system. Describe FIVE factors you would consider when deciding which option to take. **(10 marks)**

c) Explain which stages of a project to build a new system and a project to implement an OTS would be the same and which ones would be different.

(10 marks)

Question A1 Mark scheme

a) Techniques

These might have included:

- Carry out interviews
- Conduct Joint Application Design workshops
- Review existing documents
- Analyse existing system
- Create prototypes
- Observe current working practices
- Brainstorming

(5 marks)

b) Factors for choosing

These include:

- Time - installing a package is quicker than creating it from scratch
- Cost - in most cases a package will be cheaper than building a new system
- Uniqueness of requirements - is the requirement one which no existing packaged solution satisfies?
- Importance of the function to business
- Ability to own the patent or to protect the package from external risks eg the supplier ceasing to exist

- Does the function provide a competitive edge that you don't want to share or is it a common process?
- Support and Maintenance - do you have staff that could do this or do you want it to be provided by the package vendor?
- Resources - do you have the necessary skilled staff and infrastructure resources to develop the application?

(10 marks)

c) Development stages – differences between OTS and self-build

- Feasibility Study - still highly relevant and will look at either the strategic driver or the problem to be solved.
- User Requirements - still highly relevant as the need is articulated through the lens of users
- Analysis - less certain, but a comparison could be made to make a list of selection criteria for any chosen package
- System Design - the customer has little or no say in the design of an OTS but an imaginative answer might draw parallels to a selection process here.
- Program Design - completely irrelevant
- Coding - completely irrelevant
- Testing - unit and regression are irrelevant but system and user are still relevant
- Operation - highly relevant

(10 marks)

Examiners' Guidance Notes

From section A this question was by far the most popular with over 89% of candidate attempting it. The pass rate was in excess of 70%, with all parts of the question generally well answered.

a) This part attracted some good answers with most candidates able to identify suitable techniques although a number used the entire software development lifecycle as a template for obtaining requirements and didn't consider requirements gathering as being a distinct part of the life cycle.

b) Part b was also generally well answered although there was some difficulty in identifying five factors with many repeating the same factor under different headings. Although candidates tended to identify cost and resources together with uniqueness few considered patent issues. To get full marks, not only the factor (e.g. time) needed to be identified but also how it would influence choice (e.g. an OTS system would be immediately available, while there would be a delay in developing a completely new application).

c) This part of the question presented most difficulty, with many candidates misinterpreting the question as one concerning a developer's view of the difference between building a OTS or bespoke system. There were some very good attempts which did consider most of the pertinent stages and correctly identified points of convergence and divergence.

Question A2

a) What are the FIVE key steps in the risk management planning process? **(10 marks)**

b) Draw a template form for the entries in a risk register clearly labelling the sections. **(9 marks)**

c) When deciding who would be a suitable risk owner for a particular risk what THREE factors might you consider? **(6 marks)**

Question A2 Mark scheme

a) See Cadle and Yates 235

- Identify risks and log risks
- Prioritise risks by assessing probability and likelihood
- List options for dealing with risk and chose response
- Implement response
- Evaluate response

(10 marks)

b) Should be a template or log (1 mark) and contain the following, for example:

- a reference or unique id
- A title
- A description
- the current status of the risk
- Potential Impacts
- Risk Owner
- Actions planned to be taken
- Actions taken
- Date for next review
- Did the risk materialise as expected? **(9 marks)**

c) Has the prospective risk owner:

- sufficient information to make decisions,
- the necessary resources,
- the necessary authority,

(a vested interest in the success of the project)? **(6 marks)**

Examiners' Guidance Notes

Approximately 38% of candidates attempted this question. It is disappointing that almost 78% of candidates obtained under one quarter of available marks.

a) Most candidates had difficulty in identifying the five key steps in the risk management planning process. Answers in this part tended to be vague, for example, identifying some terms but no appreciation of process. Attempts at this part tended to concentrate on the general planning issues of a complete project and didn't consider the specifics of risk planning. Many answers contained reference to work breakdown structures and network diagrams showing some degree of confusion between risk planning and project planning.

b) Part b was generally well attempted by candidates. Surprisingly most were unable to sketch a reasonable template and most omitted simple basic requirements such as ID and a title. This part attracted some good attempts showing an appreciation of the register as part of a risk process control with suitable annotations. A good number of candidates simply listed, without a template, possible (often incomplete) labels.

c) Part c was the most poorly answered part of this question with many candidates either avoiding it altogether or simply giving role headings as an answer. A significant number of candidates saw this as a question about HR recruitment or focused on ethical issues of honesty and diligence. Few saw this part of the question as being one concerning risk ownership in a process model.

Question A3

a) Briefly describe FOUR estimating techniques that can be used on an IT project.

(8 marks)

b) Choose an estimating approach, from the ones you have identified, suitable for the following scenario justifying your choice compared to the other approaches.

You are a member of a 30 person IT department that has just been created within a new company. The IT Manager is a very experienced professional with many years' experience of leading IT change and new product development. You are one of four IT Project Managers in the department. The rest of the IT department is made up of people from a variety of other IT companies who have been recruited for their knowledge of programming, database design and networking. Your first assignment is a project to develop a new online booking system for a travel company. This is your biggest and newest client. The project will involve elements of design, coding, database creation and connectivity over a number of remote sites. You have been asked to estimate the effort involved in the project so a successful and profitable bid can be made.

(8 marks)

c) Some estimating methods use input variables or parameters which are called drivers. Describe three drivers that could be used in this parametric approach.

(9 marks)

Question A3 mark scheme

a) These could include (Hughes pp 86-90):

- Top Down / Analogy
- Bottom Up / activity or product based decomposition
- Parametric including Function Point, Lines of Code, CoCoMo
- Checklist/standard product
- Delphi
- Expert

1 mark for identification and 1 for explanation for each of 4 methods

(8 marks)

b) Has the candidate considered

- There is a lot of knowledge and experience in the department so it could be possible to use decomposition and bottom up - WBS/PBS approach
- That people are new to each other and may be reluctant to say what they really think and therefore the best way of harnessing this knowledge in a non-threatening way would be to use the Delphi approach.
- It is not possible to rely on any parametric models because you have no historic data. The department is new. However, it might be able to use industry standard data – but this would be less accurate in the local context
- Also hard to use an analogy approach because you have no similar / analogous projects to compare it to.

Two marks each. This is a guideline and each valid point made can attract up to 2 marks. For example a student might say that while the company is new and there is no analogous project to use Top Down it may be that some of the team members have experience of analogous projects which could be used. The question aims to test the student's ability to apply knowledge of the techniques to a given situation.

(8 marks)

c) 3 marks each, 1 mark for the label and up to 2 for the description. The three drivers selected could come from:

- Size drivers which give an idea of the amount of work involved - number of sites, number of terminals/hardware pieces, number of functions, lines of code
- Productivity drivers which affect the amount of work that can be done per time unit (e.g. hour, day). These can relate to the difficulty of the task, the capability of the developer, the availability of tools and platforms,
- The nature of the product (e.g. a safety critical project will need more effort spent on quality control).

(9 marks)

Examiners' Guidance Notes

This question was the least popular in Section A although almost 45% of candidates achieved pass marks. This question attracted some of the highest marks in Section A. Of those candidates who failed, the majority gained 5 marks or less and can be seen as finding all parts of the question difficult.

a) This part was generally well answered although some candidates were unable to identify the full four techniques. There was a good degree of confusion between top down and bottom up with few candidates mentioning function points or lines of code. Most could identify suitable estimating techniques but could not explain the technique.

b) Part b was largely dependent on correctly identifying a suitable estimating method. Many candidates who confused methods in part a carried this onto this question. Many candidates gained marks from applying the estimation method even though the method chosen may not have been optimal (using parametric data from industry standard) although answers of this kind tended to be open ended (possibly as candidates realised the shortcomings). Candidates did show an appreciation of applying techniques to the development process and in most cases did give an account of the issues to be considered. In those cases where lower marks were gained the reason tended to be a lack of coherence in applying the selected methods to the decomposition of the project characteristics. The few excellent answers probably reflect greater maturity in exposure to project work

c) In general this part was poorly attempted with many avoiding any answer or giving a limited label of a driver name but no coherent description. Of those who gave

reasonable answers many were able to make a good distinction between project types requiring appropriate measures but then confused the appropriate drivers, such as correctly seeing safety critical as needing more effort but linking this to size drivers.

Section B

Question B4

a) Briefly define the term “quality” as applied to an IT project. **(3 marks)**

b) Identify THREE differences between quality assurance and quality control.

(6 marks)

c) At what stage in the project should the project test plan be created and test cases prepared? **(3 marks)**

d) Describe FOUR techniques for carrying out quality control on a software system during development **(8 marks)**

e) In addition to software what else can be tested on an IT project**?** **(5 marks)**

Question B4 Answer Pointers

a) A standard definition for quality is:

CONFORMANCE to stated CRITERIA agreed by the CUSTOMER or its representatives

3 marks awarded if all three of these key points, or their equivalents, were identified. (NB. Note that these are NOT the same as the project success criteria – requested later in B5)

b) Briefly:

- Quality Control is carried out within the project / QA is external to it.
- Quality Control checks products/deliverables /QA checks processes
- QC checks are done against unique criteria for this project / QA is carried out against good practice

In more detail, the standard comparisons 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.

2 marks for **each** of the three requested clear, well-explained, varied valid differences

(6 marks)

c) If the standard V model is used then the project test plan should be developed after the analysis phase, when the requirements are known. In general such plans should be produced once the requirements have been agreed, but before systems development commences. **(3 marks)**

d) There are a number of techniques for carrying out quality control on a software system during the development phase. These could include:

- Unit Testing
- Fagan Inspections
- Peer Review
- Black Box Testing
- System Testing
- Regression Testing
- Performance Testing
- Reliability Testing

Up to 2 marks each awarded for naming and describing clearly FOUR of these (or similar) techniques, (**8 marks)**

e) Other aspects of the project that can be tested could include:

- Hardware, and network
- Documentation
- Users (who have undergone training)
- Facilities - for environmental factors such as heat generated or electricity consumed
- Procedures - for accessing support or logging faults

Up to 2 marks awarded for each other aspect of possible testing, if clearly identified and explained. **(5 marks)**

Examiners' Guidance Notes

Unusually, the three questions in Section B were almost equally popular with candidates. In part b of this question, many candidates did not restrict their answer to just four QC techniques.

a) There were many varying definitions here, but they were often quite vague and missed one or more of the three underlying points. Too often "cost" and "time" implications, or just "meeting requirements" were mentioned, rather than emphasising the need for quality. Several candidates supplied the above "standard" definition but some then made slight errors in the wording which suggested a lack of understanding of the underlying concept.

b) The distinction between these two concepts appeared usually to be understood in principle but was often not described very clearly, particularly the over-riding review and audit approach of QA. Several candidates referred to the cost and/or timing of each concept, identifying that the QA cost would not be within the specific project budget, some of these stated (incorrectly) that QA could not take place until after the project has finished, implying again a lack of understanding.

c) This part of the question referred very clearly to the *creation* of the "project *test* plan", but many candidates appeared to confuse this with the "overall project plan", which is not the same thing. Others related it to the feasibility study, the actual testing phase, or stated "before testing starts", for which no marks were awarded. Again there were a number of somewhat vague answers such as "at the start of the project"

d) This referred very specifically to the software development phase. Again several candidates referred to cost and time in this answer, rather than "meeting requirements" and "fitness for purpose", etc.

As well as the various testing types listed above, other approaches such as "adherence to programming standards" and "the use of reliable/proven development tools" were accepted here, though rarely stated. Other more general techniques (such as Pareto analysis, Six Sigma, Quality Circle, etc) that relate mainly to quality control or error minimisation/prevention in different types of project needed to be related directly to software development here.

e). Answers to this part of the question were quite frequently omitted, though there were some good answers. However relatively few answers extended to IT project topics other than software development, but some (incorrectly) considered team coherence, staff performance or post-implementation software maintenance.

Question B5

a) Name FOUR criteria by which a project can be judged a success. **(4 marks)**

b) Your company has decided to develop a new in-house computer system and the project plan has been prepared. Explain briefly the FOUR key steps (which might then be repeated) in the project control life cycle. **(5 marks)**

c) A project board has been set up and will meet monthly. You are the project manager and must prepare a report for each meeting. Describe EIGHT different items of information that you might expect to include in each such monthly report. **(16 marks)**

Question B5 Answer Pointers

a) The full 4 marks for:
- Completed to schedule
- Completed within budget
- Meeting all requirements (or perhaps fulfilling the business case)
- Providing proven or adequate quality

(**2 marks** only for a short 4-word list such as: eg cost, time, scope, quality)

b) The expected four key steps of the project life cycle are:
- Monitor progress (time, cost and deliverables) against the plan
- Compare actual progress with planned progress
- Identify variations from the plan
- Take any appropriate corrective action at this stage.

3 marks for naming, correctly, the four 4 phases with a further 2 marks for the quality of explanation, emphasising the need to identify variations from the plan quickly and to then take sensible, and speedy, corrective action. **(5 marks)**

c) 1 mark each for identifying clearly, with a further 1 mark each for a sound explanation, the requested eight distinct different information items, which could include some from the following list:
- Progress to date against plan
- Graphical representation of progress
- Expenditure to date against budget
- Use of resources to date
- Milestones achieved
- Deliverables produced/completed
- Reasons for any variations from plan/budget to date
- Recommended corrective action

- New issues/problems
- Unresolved issues/problems from previous months' reports
- Review of risks, and changes to risk assessments
- Staffing issues
- Any anticipated issues/problems
- Anticipated progress and deliverables for the forthcoming reporting period
- Actions/decisions (especially by Board members) required now and/or during forthcoming period.

Variations of a single information item type (such as progress against the project plan, which could be broken down further into "tasks started but not finished on time", "tasks not started on time", etc) were treated as a single information type in this context.

(16 marks)

Examiners' Guidance Notes

This question covers three different areas of project management and was, by a narrow margin, the most popular in Section B.

Most candidates were well aware of the concept of success criteria in part a, but in part b many tended to confuse the project *control* life cycle (as named and emphasised in the question) with the project *development* life cycle – which is not the same thing. Part c is based on *regular monthly* reporting *by the* project manager *to the* project board, but many candidates based their answers on other types of report, such as a project summary, a project initiation report or the original business case.

In part c many candidates offered more than 8 possible items for inclusion in the report and some failed to distinguish each item clearly.

a) The question expected a fuller definition of the four criteria than just four words (e.g. Cost, Time Scope and Quality).In this context "scope" or "satisfying the customer" is not quite the same as "meeting all the project requirements fully".

b) As noted above, the word "control" was highly significant in this question but, disappointingly, most candidates overlooked it and concentrated instead on the project development life cycle or the various project stages, neither of which were awarded any marks. In the answers that did refer correctly to "project control" candidates often then failed to identify the three key factors (time, cost and deliverables) that needed to be included. Some candidates quoted the four phases, but in the wrong order – which perhaps showed a lack of understanding of the process.

c) Candidates needed here to consider both the purpose of the report (monthly progress) and the recipients (the project board) when selecting the information types that it would be sensible to include. The board need to know "How well is the project progressing?" and are there any problems that need to be brought to their attention. There was sometimes a tendency to include highly technical decisions, such as the programming language to be used, or low level detail (such as timesheets) rather than the broader aspects of progress and any problems that the manager feels it sensible to bring to the board's attention. Some of the items for inclusion in the report were not described at all precisely, such as "resources" and there was a tendency to confuse "status" with "progress".

Some answers listed 10 or more information types whereas the question specified only eight – with a good description of each type, concentrating on and explaining how this would inform the board members of each aspect of project progress.

Question B6

The sales department in your company, who have their own in-house sales system, are being relocated to new offices where they will also have a new server–based sales database system. The IT section have set out an outline plan for the IT aspects of the move, with 9 main tasks (with estimated durations):

	Activity	Weeks
A	order and deliver the new database system and server	4
B	design and install the network infrastructure	7
C	order, deliver and install new PCs and printers	9
D	test the database system, server and network	3
E	test the PCs with the server and network	2
F	copy existing sales data to the new database system	1
G	copy other existing PC software to the new PCs	3
H	test all software and database on the new PCs and server	1
I	train users	2

Tasks A, B and C can be undertaken at the same time, but A and B must be completed before D can start. Tasks C and D must be completed before E can begin. E must be completed before F and G can start. F and G can be undertaken at the same time, but both must be completed before H can start. I must follow H.

a) Draw a network diagram (Activity-on-Node) for this project, showing (on the diagram) the earliest and latest start dates, the earliest and latest finish dates, the duration and the float for each task.

Provide a node key explaining the layout and contents of the nodes used in your diagram.

Draw a Gantt chart for the same project tasks, showing each of these tasks, all dependencies and float, and each task's duration.

Highlight the critical path on each diagram.

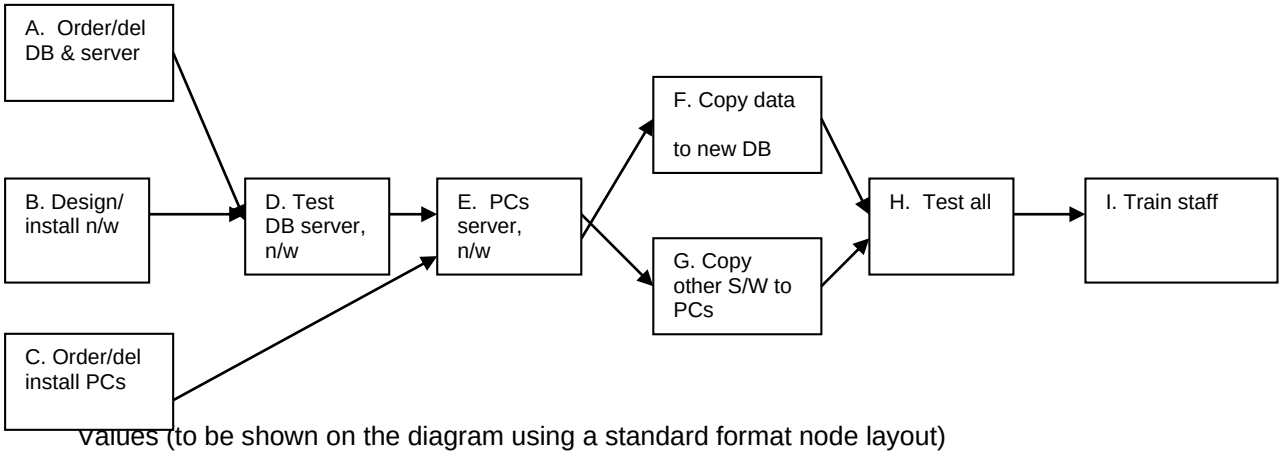
What is the total duration of this critical path?

(7 marks)

b) Discuss briefly the most significant differences between the two types of diagram, and highlight TWO advantages of the Gantt chart and TWO advantages of the network diagram **(8 marks)**

Question B6 Answer Pointers

a) This expected an A-on-N network diagram layout as below, with fully completed nodes (preferably to BS 6046 or as shown on page 33 of the recommended ISEB text) containing all the required values shown in the table below



Values (to be shown on the diagram using a standard format node layout)

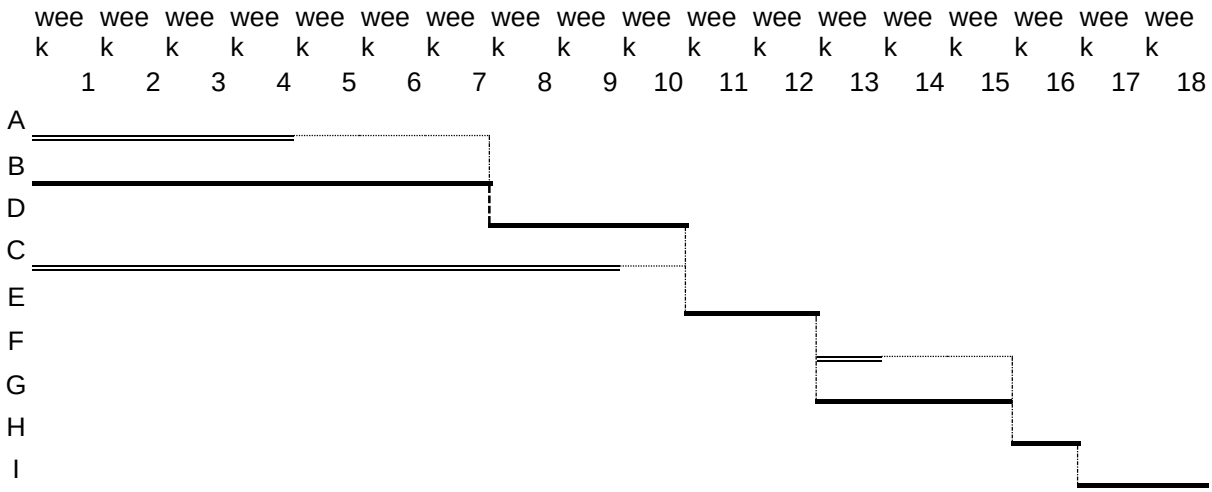
Task	EST	LST	EFT	LFT	Dur	Float
A	0	3	4	7	4	3
B	0	0	7	7	7	0
C	0	1	9	10	9	1
D	7	7	10	10	3	0
E	10	10	12	12	2	0
F	12	14	13	15	1	2
G	12	12	15	15	3	0
H	15	15	16	16	1	0
I	16	16	18	18	2	0

Marks awarded for:

Correct diagram layout, with all dependencies & values shown	3 marks
Correct values, in each node on the diagram	3 marks
Correct highlighted critical path (B,D.E,G,H,I)	1 marks
A node key, with explanations	2 marks
Correct duration (calculated from either the A-on-N or the Gantt chart)	2 marks

(11 marks)

a) This expected to be a Gantt chart similar to:



Task

Float

Critical Path B,D,E,G,H,I

The Gantt chart should include:

- A clear logical scale
- An obvious key
- A clear, correct, highlighted critical path
- Correct durations and dependencies

A maximum of **6 marks** awarded, with 1 mark deducted each per omission or major error **(6 marks)**

b) The main differences could be that:

Network diagrams represent visually the full details of each task, the dependencies between tasks and thus the flow of work within the project but without any visual representation of the respective and comparative durations of each task, whereas
Gantt charts are scaled bar charts where each bar clearly represents the exact duration of each task, and displays more clearly the timing between tasks and is especially good at displaying concurrent tasks and allocating resources to tasks.

The advantages of a Gantt chart (in comparison with A-on-N) include:

- More visual, thus easier for non-technical staff (and senior management) to understand
- Shows clearly timescales, concurrent tasks, more effectively
- Is a better basis for resource allocation (including staff)
- Good for indicating progress to date.

Advantages for A-on-N diagrams include:

- Shows dependencies very clearly
- Gives much fuller information on each task, making it easier to evaluate the effect of task delays
- Easier to re-work and re-calculate if there are any task changes

- Better for displaying dependencies
- Float is more clearly defined and displayed for each task,
- The critical path is easier to highlight and see

2 marks for the discussion of the main differences, plus 3 marks for each set of two clearly described advantages. **(8 marks)**

Examiners' Guidance Notes

Unusually this was not the most popular question in this Section.

a) Most candidates produced a clear well-designed basic A-on-N diagram here and calculated the correct duration, though there were a surprising number of errors in identifying the critical path (tasks with 0 float) itself. There were fewer A-on-A diagrams presented compared with recent papers.

Ideally in a network diagram (or Gantt chart) the dependencies should flow from left to right, sometimes top to bottom, with no crossing dependency lines (as shown in the outline A-on-N diagram and Gantt chart above). Arrowheads help. Many candidates did not use formatted nodes at all, or supply a node key, and some did not state the time units.

Often one or more of EST, LST, EFT, LFT and float were omitted from the calculated values, perhaps implying an A-on-A approach rather than A-on-N (as initial rough work often included an A-on-A diagram). The float value was often not included within the node "box" itself, the meaning of the abbreviations LST, etc was

sometimes omitted from the node key and the critical path (though named in the answer) was not always highlighted on the diagram (asrequired by the question).

In contrast, the Gantt charts, drawn after the network diagram, were frequently less complete and difficult to follow easily – especially the critical path. In several instances candidates highlighted the critical path as just the dependency lines between the tasks, but **not** including the tasks concerned. Float, and task dependencies, were often omitted or shown incorrectly.

b) Comparatively few answers here included a clear discussion of the main differences between the two types of diagram.

Many candidates provided lists of advantages and disadvantages, rather than concentrating on just **two** main advantages of each. In a significant number of answers the same points were included under both headings, and sometimes contradictory points were included within the same list of advantages, implying perhaps a lack of underlying understanding of the two approaches.

Marks were deducted for inaccurate assertions (such as stating that an A-on-N diagram does not show dependencies) or listing/naming the same advantages (e.g. “can display the critical path”) against both diagram types (this occurred quite frequently).