



General Certificate of Education

Information and Communication Technology 6521

**ICT5 Information: Policy, Strategy and
Systems**

Mark Scheme

2008 examination - June series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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GENERAL GUIDANCE NOTES FOR EXAMINERS

Overall guidelines

1. All examples accepted should be clearly related to the subject area and should not be “generalised” examples.
2. Attention should be paid to ensure that marks are not awarded for simple restating of the question or the stem, often involving the exact same terms.
3. The answers should be providing evidence of more than “man in the streets” knowledge of ICT.
4. It should be remembered that scripts could be seen after they are marked and so consistency of approach and correct mechanics of marking are essential.
5. Rules on positioning of ticks and marks are to aid in checking and remarking of scripts.
6. Do not expect the candidate to use the exact wording given in the mark scheme. If you are in doubt as to the correctness of an answer given by the candidate, consult your Team Leader.
7. The answers given in the mark scheme are exemplars. Credit must be given for other correct answers not given in the mark scheme. Please refer to Team Leaders where there is any doubt.
8. One-word answers, where acceptable, will be indicated on the question paper.
9. Where a mark is only available if there is a previous correct response, i.e. a dependent mark, then this will be indicated on the mark scheme.
10. The meaning of ICT-specific words and phrases are as defined by *A Glossary of Computing Terms* (current edition) by the British Computer Society.
11. Responses in the mark scheme with a ‘/’ are either/or alternatives.

Specific marking guidelines

12. The basic rule is one mark one tick. The tick to be positioned at the point where the mark is gained in the answer and definitely not in the margin.
13. The only figures in the margin should be sub-totals for parts of questions and a final ringed total for a whole question.
14. Where questions are divided into parts a, b and so on, and a mark is indicated for each on the paper, a mark should be positioned at the end of the appropriate response in the margin.
15. There should in effect be a mark in the margin at every point there is one on the question paper and a number of ringed totals, which relates directly to the number of questions on the paper.

16. Where a question has only one part, the total for that question should be written once and then again and circled. This allows for easy checking that totalling and transcription of marks is correct.
 17. All zero values should be crossed through.
 18. All blank spaces should be crossed through with a vertical line through the text space – not in the margin.
 19. All writing must be marked as read, either by the presence of ticks or by striking through the script with a vertical line.
 20. All blank pages must be crossed through.
 21. Where candidates have added extra to their answers later in the script, the total mark should be indicated as including x from Page y. The total mark should be in the position where the first section of the answer finishes.
 22. The use of the following symbols/marks is acceptable:
 - a. BOD – where the benefit of the doubt is given for the point the candidate is making. This is generally where poor writing or English is an issue. Its widespread use should be avoided.
 - b. Underlining of subject specific terminology, which is misused or incorrect e.g. encoding rather than encryption, information rather than data.
 - c. Underlining can also be used to highlight clearly incorrect statements or the use of a generalised phrase such as quicker, faster, cheaper etc.
 - d. An omission sign ^ should be used where the candidate has given insufficient information to gain a mark. This is particularly useful when a teacher or student looks at scripts against a mark scheme.
 - e. It may be appropriate to indicate where the same point has been covered more than once by an arrow or where a point has been covered in several lines of prose by the use of brackets.
 - f. The use of letters associated with ticks **may** be used to indicate different areas being marked in a question, particularly to indicate the different bullet points in an essay. THIS WILL BE OUTLINED AT STANDARDISATION.
 23. **NO** other symbols or comments should be used.
 24. Markers are responsible for checking
 - a. The transposition of marks to the front sheet
 - b. That all work has been marked on each script
 - c. That all marks for individual questions are totalled correctly
 - d. That the script total is transferred to the box at the top right of the script.
 - e. That they **clearly** initial the script, under the total at the top right, so it is possible for the Principal Examiner to identify each markers work.
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Information: Policy, Strategy and Systems

Examiners: the answers given in this mark scheme are exemplars. Credit must be given for other correct answers not given in the mark scheme. Please refer to Team Leaders where there is any doubt.

1	<p>Topic 14.8 – Software Development</p> <p>State three ways of providing a software solution to a specialist task.</p>	<i>(3 marks)</i>
	<p>Any three:</p> <ul style="list-style-type: none"> • Purchase ready made/download/off-the-shelf • Leasing software • In-house-created bespoke • External software house bespoke • Customise generic software <p style="text-align: right;">Max 3</p>	
2	<p>Topic 14.3 – Database Management Concepts</p> <p>With reference to database management software, explain what is meant by the following terms:</p> <p>(a) data consistency; (b) data integrity; (c) data redundancy; (d) data independence.</p>	<p><i>(2 marks)</i> <i>(2 marks)</i> <i>(2 marks)</i> <i>(2 marks)</i></p>
	<p>a) data consistency: Data is only stored once, and this is the sole source of that data. (1) + expansion / example (1) (2,1,0) marks</p> <p>b) data integrity: Correctness / how trustworthy the data is. (1) + expansion/ example (1) (2,1,0) marks</p> <p>c) data redundancy: Data is stored more than once / repeated (1) + expansion/ example (1) (2,1,0) marks</p> <p>d) data independence: Changes in the structure of the data only affect those programs / functions that are reliant on that part of the structure (1) + expansion / example (1) OR Data structure is separate from programs that access it (1) + expansion / example (1) (2,1,0) marks</p>	

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<p>3</p>	<p>Topic 14.4 – Communication and Information Systems</p> <p>Describe the concept of a client server database.</p>	<p><i>(4 marks)</i></p>
	<ul style="list-style-type: none"> • client requests queries / reports to be run (1) • server runs queries / reports / does the processing (1) • supplies results to client (1) • one copy of data is held on server, rather than copies held on workstations (1) • data consistency is maintained (1) • queries and reports can be stored locally to users (1) • client does not need to be powerful (1) • communication between client and server is minimal (1) <p style="text-align: right;">Max 4</p>	

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4	<p>Topic 14.9 – Software Reliability</p> <p>(a) Explain what is meant by the terms alpha testing and beta testing.</p> <p>(b) Name two types of maintenance, and explain why each may be necessary.</p>	<p>(4 marks)</p> <p>(6 marks)</p>
	<p>(a)</p> <p>One mark per point, to a maximum of three each for either alpha, beta; four in total: (full marks may be 1 + 3, 3 + 1, or 2 + 2)</p> <p>Alpha testing:</p> <ul style="list-style-type: none"> • Testing done by the development company itself (1) • Systematically / to a test plan (1) • Unit / system testing (1) • Using a restricted test data set (1) • To make sure all components work together as expected (1) • Version may not be completely finished (1) <p>Beta testing:</p> <ul style="list-style-type: none"> • Testing done by a select number of end users (1) • Using real data / in a real environment (1) • Using software in ways unplanned by developers (1) • To provide feedback into further software development (1) • For marketing / raising customer awareness / cheap advertising (1) <p style="text-align: right;">Max 4</p> <p>(b)</p> <p>Maintenance type (1) Reason (1) Expansion/explanation/example (1)</p> <p>EXAMPLE ANSWERS.</p> <p>CREDIT ANY GOOD EXAMPLES/EXPLANATIONS.</p> <p>Any 2 maintenance types only to max 6:</p> <p>Corrective maintenance (1) to fix logical errors in the software (1) e.g. software hangs if machine sleeps on login screen (1)</p> <p>Adaptive maintenance (1) to deal with changes that will affect the software within the organisation /external changes (1) e.g. to interface with new versions of applications software / hardware / new legislation (1)</p> <p>Perfective maintenance (1) to add extra functionality to the software / enhance performance (1) e.g. wizard for user examination of network connection state (1)</p> <p style="text-align: right;">2x(3,2,1,0) marks</p>	

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<p>5</p>	<p>Topic 14.7 – Human/Computer Interface</p> <p>Name two system resources and, for each one, state why a sophisticated Human-Computer Interface (HCI) makes high demands on it.</p>	<p><i>(4 marks)</i></p>
	<p>Naming a resource (1) Why sophisticated HCI makes high demands on it (1) EXAMPLE ANSWERS. ACCEPT ANY GOOD RESPONSES FOR 2 OR 1 MARKS PER RESOURCE.</p> <ul style="list-style-type: none"> • Processor (1) time to display visual interface details / track mouse movements / identify selections (1) • Hard Disk Drive / Backing Store (1) a GUI requires many lines of code / images, which need to be stored (1) • RAM / Immediate Access Store (1) large amounts of code/images need to be held in memory for execution (1) <p style="text-align: right;">2 x (2, 1, 0) marks</p>	

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6	<p>Topic 14.2 – Evaluation of Software</p> <p>A bookseller wishes to evaluate a new software package for selling online. Explain why the bookseller might need to establish the following evaluation criteria.</p> <p>(a) functionality</p> <p>(b) usability</p> <p>(c) performance</p> <p>(d) robustness</p> <p>(e) portability</p>	<p>(2 marks)</p> <p>(2 marks)</p> <p>(2 marks)</p> <p>(2 marks)</p> <p>(2 marks)</p>
	<p>Example (1) Explanation/expansion (1). EXAMPLE ANSWERS. ACCEPT ANY GOOD RESPONSES FOR 2, OR 1 MARKS PER QUESTION PART.</p> <p>(a) Functionality: will software complete transactions securely (1) so that customer confidence is retained (1) (2 marks)</p> <p>(b) Usability: is software easy to understand (1) will customers be presented with a common interface layout across different pages (1) (2 marks)</p> <p>(c) Performance: is the software fast enough to (1) to customer satisfaction (1) (2 marks)</p> <p>(d) Robustness: if site receives heavy use will software cope (1) without crashing (1) (2 marks)</p> <p>(e) Portability: DO NOT ACCEPT TRANSFERABILITY OF DATA ANSWERS will software run on different types of server hardware (1) so hardware can be upgraded without rewriting software (1) accept: different browser software can access website (1) and view pages correctly (1) (2 marks)</p>	

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7	<p>Topic 14.10 – Portability of Data</p> <p>(a) Give two ways by which data can be transferred successfully between different applications on the same computer system.</p> <p>(b) Give two ways by which data can be transferred successfully between different computer systems.</p>	<p>(2 marks)</p> <p>(2 marks)</p>
	<p>(a)</p> <ul style="list-style-type: none"> • Standard data formats / a recognisable example of a standard file format e.g. .jpeg, .mp3, .gif/Import and Export (1) • OLE/DDE (1) • Copy and Paste / Drag and Drop (1) • Mailmerge (1) <p style="text-align: right;">(2 marks)</p> <p>(b)</p> <ul style="list-style-type: none"> • Standard data formats / a recognisable example of a standard file format e.g. .jpeg, .mp3, .gif/Import and Export(1)IF NOT GIVEN IN a) • Compatible media formats / portable media formats / example of a standard format e.g. ISO standards, CD-RW, USB storage device, ZIP disks, DVD/RW (1) • E-mail using file attachments (1) • Sharing over a network / example of a network e.g. LAN, WAN (1) • Wireless connectivity / bluetooth / infra red etc (1) • Emulation software to allow transfer between different platforms / OS (1) • Gateways (1) <p style="text-align: right;">(2 marks)</p>	

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8	<p>Topic 14.5 – Networks</p> <p>(a) State four methods of protecting the security of a computer network and, for each one, describe how it protects the network.</p> <p>(b) A network service may be improved through the use of network audit software.</p> <p style="padding-left: 20px;">(i) Explain why network audit software is used.</p> <p style="padding-left: 20px;">(ii) Give four items of data that may be recorded by the network audit software.</p>	<p>(8 marks)</p> <p>(3 marks)</p> <p>(4 marks)</p>
	<p>(a) Any four:</p> <ul style="list-style-type: none"> • Use firewall (1) protect system from attack / hackers (1) • Use encryption (1) eavesdroppers cannot use intercepted data (1) • Set access rights / levels (1) so only authorised users have access to sensitive data (1) • Need login / password (1) to ensure authenticity of users (1) • Regular change of password (1) eg suggested interval / company policy (1) • Use anti-virus software (1) protect from corruption / attack (1) • Backup and store offsite (1) added security against loss of data (1) • fit UPS (1) protect from natural disaster / power failure (1) <p>Credit any sensible answer (1) plus description/expansion (1) 4 x (2, 1, 0) marks</p> <p>(b)(i) NOT accountancy issues Improve security (0) Any 3: In order to:</p> <ul style="list-style-type: none"> • make a log of transactions (1) • track activities (1) • detect misuse (1) • deter misuse (1) • monitor performance of the system (1) • legislative / licensing reasons (1) <p>Max 3</p> <p>(b) (ii)</p> <ul style="list-style-type: none"> • Identity of user / who logged on (1) • What date / time logged on (1) • What date / time logged off / how long for (1) • At what workstation / network address (1) • Number of logon attempts / attempts at unauthorised accesses (1) • What applications run (1) • What files opened / web pages (read notion) (1) • What file writes / updates (edit notion) (1) <p>Credit any sensible answer Max 4</p>	

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9	<p>Topic 14.6 – Human/Computer Interaction</p> <p>The designers of a word processing software package must consider the psychological factors that affect the way in which the user will interact with the software.</p> <p>State four psychological factors the designers should consider and, for each one, use an example to explain how this factor could be considered in the design of the word processing software.</p>	<i>(12 marks)</i>
	<p>factor (1) example in context (1) explanation/expansion (1)</p> <ul style="list-style-type: none"> • user friendly, (1) wizards (1) to guide user through use of complex functions e.g. mail merge (1) • provide short cuts for experts, (1) hot keys (1) to access functions quickly e.g. format paragraph (1) • give help to novices, (1) onscreen link to help pages (1) to access if stuck (1) • make use of human long-term memory, (1) user can remember how to navigate (1) to required function e.g. page orientation (1) • make use of human perception, (1) sensory alert (1) if unavailable function selected (1) <p style="text-align: right;">4 x (3, 2, 1, 0) marks</p>	

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10	<p>Topic 14.1 – Policy and Strategy Issues</p> <p>An organisation needs to consider the strategic implications of software, hardware, configuration and backup options. Discuss this statement, paying particular attention to:</p> <ul style="list-style-type: none"> • the range of needs of different users within the organisation • the need for software and hardware upgrades • backup systems. <p>The quality of written communication will be assessed in your answer.</p>	<i>(20 marks)</i>
	<p>The solution for this question is intended to provide a framework of key concepts rather than a definitive solution. The aim is to establish an agreed standard that can be applied consistently, by all examiners, taking account of the many alternative answers to this type of question.</p> <p>Allocation of marks:</p> <p>Range of <u>n</u>eeds of different users within the organisation (code as N) The need for hardware and software <u>u</u>pgrades (code as U) <u>B</u>ackup systems (code as B)</p> <p>Max of 16 for three issues Max of 14 for two issues Max of 12 for one issue</p> <p>Maximum mark for content = 16/20 if all three issues are addressed <i>Quality of written communication (code as Q) - 4 marks maximum</i> Credit any sensible answer (1) plus expansion (1)</p> <p>Range of <u>n</u>eeds of different users (N marks) type of user (1) user needs (1) Eg:</p> <ul style="list-style-type: none"> • operational /implementation level users (1) routine data entry (1) • tactical level users (1) routine management role (1) • strategic level users (1) MIS for organisation overview (1) • novice users (1) help / wizards / usability of interface (1) • expert users (1) rich functionality (1) <p>Need for hardware and software <u>u</u>ppgrade (U marks)</p> <ul style="list-style-type: none"> • hardware development / example (1) expansion (1) • software development / example (1) expansion (1) • organisation ethos (1) expansion (1) • task driven change (1) expansion (1) • software change (1) expansion (1) 	

	<p>Backup issues (B marks)</p> <ul style="list-style-type: none"> • Media (1) suitability of medium (1) • Frequency (1) how often the data on the system changes will affect how often the backup needs to be made (1) • Storage location / security (1) separate location / fire -proof / other security measures (1) • Volume (1) the backup needs to take into account how much data there is e.g. for how long the backup will take (1) • What files to back up / backup type (1) incremental / full (1) • Personnel conducting the backup (1) so that the company can be confident that the backup has occurred (1) • Logging record to indicate when the backup has taken place (1) and any problems that may have occurred (1) • Recovery testing (1) integrity of the backup needs to be ensured, so that if it needs to be recovered it can be relied on (1) • Timing / How critical the system is (1) at quiet times / can the system be taken offline in order to backup? (1) 	
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Quality of Written Communication Marks (Q marks)

- 1 mark The candidate has expressed simple ideas clearly, but may be imprecise and awkward in dealing with complex or subtle concepts. Arguments may be of doubtful relevance or obscurely presented. Errors in grammar, punctuation and spelling may be noticeable and intrusive, suggesting weaknesses in these areas.
- 2 marks The candidate has expressed straightforward ideas clearly, if not always fluently. Sentences and paragraphs may not always be well connected. Arguments may sometimes stray from the point or be weakly presented. There may be some errors of grammar, punctuation and spelling, but not such as to suggest a weakness in these areas.
- 3 marks The candidate has expressed moderately complex ideas clearly and reasonably fluently through well-linked sentences and paragraphs. Arguments will be generally relevant and well structured. There may be occasional errors of grammar, punctuation and spelling.
- 4 marks The candidate has expressed complex ideas clearly and fluently. Sentences and paragraphs follow on from one another smoothly and logically. Arguments will be consistently relevant and well structured. There will be few, if any, errors of grammar, punctuation and spelling.

	<p>With criteria of this type, candidates are given a mark on the basis of a “best-fit” approach.</p> <p style="text-align: right;">TOTAL MARKS – 20</p>	
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