



General Certificate of Education

Information and Communication Technology 6521

Unit 5 Information: Policy, Strategy and Systems

Mark Scheme

2008 examination – January 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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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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 street” 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.

Specific marking guidelines

11. The basic rule is one mark, one tick. The tick is to be positioned at the point where the mark is gained in the answer and definitely **not** in the margin.
12. The only figures in the margin should be sub-totals for parts of questions and a final ringed total for a whole question.
13. Where questions are divided into parts a, b, c 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.
14. 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.
15. 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.

16. All zero values should be crossed through.
17. All blank spaces should be crossed through with a vertical line through the text space – not in the margin.
18. All writing must be marked as read, either by the presence of ticks or by striking through the script with a vertical line.
19. All blank pages must be crossed through.
20. Where candidates have added 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 answer starts.
21. The use of the following symbols/signs 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, user friendly and so on.
 - 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.**
22. **NO** other symbols or comments should be used.
23. 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.

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>14.9 Software Reliability <i>Software developers should test new software thoroughly.</i></p> <p><i>Explain three reasons why new software may not behave correctly, even when it has been thoroughly tested.</i></p>	(6 marks)																
	<p>1 for reason, 1 for explanation / expansion</p> <p>Example answers. Credit any reasonable explanation or expansion.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%; text-align: center;">Reason</th> <th style="width: 50%; text-align: center;">Explanation / expansion</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • cannot be tested with every combination of hardware/ software available </td> <td> <ul style="list-style-type: none"> • so new software may cause established systems to fail or vice versa </td> </tr> <tr> <td> <ul style="list-style-type: none"> • software tends to be complex </td> <td> <ul style="list-style-type: none"> • so every single part of a system will not have been tested with every other part </td> </tr> <tr> <td> <ul style="list-style-type: none"> • new software may not be able to use older file formats </td> <td> <ul style="list-style-type: none"> • causing the company to have to re-enter data </td> </tr> <tr> <td> <ul style="list-style-type: none"> • user uses the software in a way that has not been considered </td> <td> <ul style="list-style-type: none"> • causing the software to behave in an unusual way/ unexpected results </td> </tr> <tr> <td> <ul style="list-style-type: none"> • inadequate test plan </td> <td> <ul style="list-style-type: none"> • not covering sufficient tests / scenarios </td> </tr> <tr> <td> <ul style="list-style-type: none"> • requirement to keep development cost to defined limits </td> <td> <ul style="list-style-type: none"> • lack of funding for beta testing / personnel time </td> </tr> <tr> <td> <ul style="list-style-type: none"> • requirement to keep development time to deadlines </td> <td> <ul style="list-style-type: none"> • insufficient time / rushed process / pressure to be competitive </td> </tr> </tbody> </table> <p style="text-align: right; margin-top: 10px;">3 x (2,1,0) marks</p>	Reason	Explanation / expansion	<ul style="list-style-type: none"> • cannot be tested with every combination of hardware/ software available 	<ul style="list-style-type: none"> • so new software may cause established systems to fail or vice versa 	<ul style="list-style-type: none"> • software tends to be complex 	<ul style="list-style-type: none"> • so every single part of a system will not have been tested with every other part 	<ul style="list-style-type: none"> • new software may not be able to use older file formats 	<ul style="list-style-type: none"> • causing the company to have to re-enter data 	<ul style="list-style-type: none"> • user uses the software in a way that has not been considered 	<ul style="list-style-type: none"> • causing the software to behave in an unusual way/ unexpected results 	<ul style="list-style-type: none"> • inadequate test plan 	<ul style="list-style-type: none"> • not covering sufficient tests / scenarios 	<ul style="list-style-type: none"> • requirement to keep development cost to defined limits 	<ul style="list-style-type: none"> • lack of funding for beta testing / personnel time 	<ul style="list-style-type: none"> • requirement to keep development time to deadlines 	<ul style="list-style-type: none"> • insufficient time / rushed process / pressure to be competitive 	
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<p>2</p>	<p>14.4 Communication and Information Systems</p> <p><i>In supporting the World Wide Web, describe the rôle of</i></p> <p>(a) <i>router</i></p> <p>(b) <i>a web server.</i></p>	<p>(4 marks)</p>
	<p>(a)</p> <ul style="list-style-type: none"> • acts as a gateway / connects networks (1) • maintains a table of available routes (1) • reads the destination address (1) • determines where / best route to forward packets/data (1) <p style="text-align: right;">Max (2x1) mark</p> <p>(b)</p> <ul style="list-style-type: none"> • serves files/ services http requests / to a web user/browser (1) • builds/assembles / organises web pages (1) • hosts web sites (1) • filters content (1) • restricts access (1) <p style="text-align: right;">Max (2x1) mark</p>	

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.

3	<p>14.10 Portability of Data</p> <p>Describe two ways in which standards can arise within the ICT industry.</p>	(4 marks)
	<ul style="list-style-type: none"> • Formal/ de jure standards (1) set by professional/official bodies and then passed on to the industry (1) • De facto standards / adopted without formal acceptance by professional / official bodies (1) arisen through historic precedent/ sales success i.e. through popular choice (1) <p>Examples given must be ICT examples in order to gain credit.</p> <p style="text-align: right;">Max 2 × (2,1,0)</p>	

4	<p>14.1 Policy and Strategy Issues</p> <p>Give four reasons why a school might upgrade the hardware and/or the software of its information systems.</p>	(4 marks)
	<ul style="list-style-type: none"> • hardware development or example • software development or example • organisation ethos / needs or example • task driven change or example • software pertaining to 'perfective' issues • software pertaining to 'adaptive / compliance' issues • To decrease processing time • other software change or example in school context <p style="text-align: right;">Max 4 marks</p>	

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5	<p>14.7 Human/Computer Interface</p> <p><i>Different approaches to the problem of communicating with ICT systems have led to the development of different types of Human-Computer Interface (HCI).</i></p> <p><i>Discuss the relative advantages of three different types of HCI, using examples to illustrate your answer.</i></p>	(12 marks)
	<p>Max 4 marks for discussion of any one type of HCI.</p> <p>Naming the type of HCI (1)</p> <p>Advantage (stating reason) (1) with another HCI (1) Or Two advantages (2)</p> <p>Example of appropriate use (1) Explanation of why use appropriate (1) 3 x (4, 3, 2, 1, 0)</p> <p>ACCEPT ANY VALID OTHER TYPES OF HCI: EG: Natural language, voice recognition, form fill, virtual reality etc.</p> <p>Eg 1:</p> <ul style="list-style-type: none"> • Menu driven (1) • User presented with limited choice of options (1) • To validate data entry (1) • For example to operate an ATM (1) <p>Eg 2:</p> <ul style="list-style-type: none"> • GUI (1) • Large range of menu choices / powerful functions (1) • Ready access to functionality (1) • For example in creation of document (1) <p>Eg 3:</p> <ul style="list-style-type: none"> • Command line interface (1) • Basic interface means minimum system overheads / rapid system response (1) • Expert can still control setup process through knowledge of commands (1) • For example in system setup (1) <p style="text-align: right;">Max 12 marks</p>	

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6	<p>14.5 Networks</p> <p><i>All the activity on an organisation's computer network can be logged. One reason for this logging is to charge departments for their use of system resources.</i></p> <p>(a) Give four other reasons for logging network activity and, for each one, state the data that needs to be recorded.</p> <p>(b) Explain one possible drawback of logging network activity.</p>	<p>(8 marks)</p> <p>(2 marks)</p>
	<p>TO CHARGE FOR USE (0)</p> <p>Use (1) Data item (1) EXAMPLE ANSWERS.</p> <p>Eg 1: provide systems administration with information about network load / performance (1) bandwidth used per user / per connection / storage capacities / peak throughput times(1)</p> <p>Eg 2: monitoring software licenses (1) number of concurrent users / time spent running any particular software (1)</p> <p>Eg 3: to configure disk storage allocations /locations (1) storage used per account (1)</p> <p>Eg 4: to facilitate sensible distribution / limitation of resources to users / discourage waste of resources (1) pages printed per print job / user (1)</p> <p>Eg 5: help in controlling abuse of network (1) monitoring failed logins / web sites visited (1)</p> <p style="text-align: right;">4 x (2, 1, 0) marks</p> <p>b)</p> <p>Accept any reasonable answers eg.</p> <p>logging activities entails use of processor time (1) that slows system down (1)</p> <p>logging activities may involve large volume of data (1) leaving reduced space for network activity (1)</p> <p>considerable human resources required (1) to analyse and interpret the data logged (1)</p> <p style="text-align: right;">1x(2,1,0) marks</p>	

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7	<p>14.3 Database Management Concepts</p> <p>(a) State three reasons for using a Database Management System (DBMS).</p> <p>(b) A relational database holds data that has been normalised.</p> <p><i>Describe what is meant by data normalisation</i></p>	<p>(3 marks)</p> <p>(4 marks)</p>
	<p>a)</p> <p>Any three reasons:</p> <ul style="list-style-type: none"> • to enable construction/structure of database/data dictionary/separate tables with linked fields (1) • to provide a common interface between the user and the data (1) • to allow the data to be queried (1) • to allow data to be organized/manipulated/construction of reports / forms(1) • to control access to the data/security (1) • to provide data independence (1) <p style="text-align: right;">Max 3 marks</p> <p>b)</p> <ul style="list-style-type: none"> • naming First Normal Form, Second Normal Form, Third Normal Form (1) • (1NF) Removal of repeating fields/ attributes/ ensure that values are atomic (1) • (2NF) Removal of composite keys/partial key dependencies/ ensure that non-key fields are functionally dependent on the whole primary key (1) • (3NF) Removal of non-key/transitive dependencies (1) • process for making the structure of a relational database more efficient (1) • by defining tables, fields, and relationships/ appropriate terminology (1) • process for breaking down a complex data structure into a simpler one (1) <p style="text-align: right;">Max 4 marks</p>	

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.

8	<p>14.6 Human/Computer Interaction</p> <p><i>The following data is required to appear on an order form for an online flower shop:</i></p> <p style="text-align: center;"><i>Title, Initials, Surname, Address, Postcode, Phone number, Type of flower arrangement, Quantity, Cost.</i></p> <p>(a) <i>Use a whole page of your answer book to sketch a design for the order form. (3 marks)</i></p> <p>(b) <i>Annotate your design to explain how it takes into account four psychological factors.</i></p> <p><i>Your annotation must identify each factor that you have considered.</i></p>	<p>(3 marks)</p> <p>(8 marks)</p>
	<p>a) Sketch has:</p> <ul style="list-style-type: none"> • all fields in the question included - in logical order (1) notate with 'F' on final field • appropriate title (1) • corporate presence eg Logo (1) • indication of which fields are to be list boxes • distinction between ordering address/ recipient address (1) • payment details / methods (1) • Any other sensible field / button eg 'go to checkout' / delivery options <p style="text-align: right;">Any 3 x 1 marks</p> <p>b) How factor has been considered (1) + Expansion (1) Max of 4 if inadequate reference to the Design</p> <p>Example answers:</p> <ul style="list-style-type: none"> • make use of human long-term memory (1) user can recall menu structure (1) • give help to novices (1) 'help' button to get explanation and help user to learn (1) • user friendly (1) data entry cells / buttons in logical order (1) • short cuts for experts (1) hot keys to save / delete record / auto-fill(1) • make use of human perception (1) beep if required field not entered / red message explaining field still empty (1) <p style="text-align: right;">4 x (2, 1, 0) marks</p>	

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.

9	<p>14.8 Software Development</p> <p><i>There are different ways of providing a software solution to a specialist application.</i></p> <p><i>Name four ways of providing a software solution and, for each one, explain one benefit to an organisation of choosing that way.</i></p>	(12 marks)
	<p>Do not allow benefit of cheap/cost on its own. Cost issues must be cheaper <u>than</u> for first mark and expansion for second mark. Example answers. Credit any reasonable response.</p> <p>Way of providing software (1) benefit (1) explanation/expansion (1)</p> <ul style="list-style-type: none"> • Purchase ready-made/download/off-the-shelf (1) <ul style="list-style-type: none"> ○ immediately available (1) as mass produced (1) ○ likely good support / documentation (1) on-line / call centre / instant messaging / e-mail (1) ○ likely good testing (1) established product / reputable company (1) • Leasing software (1) <ul style="list-style-type: none"> ○ cheaper short term than purchase (1) can provide more copies for use (1) ○ sensible solution to short term requirement (1) eg one-off problem / inherited task (1) ○ free upgrade paths (1) future-proofing (1) • In-house created bespoke (1) <ul style="list-style-type: none"> ○ support readily available (1) as development team are already part of company (1) ○ solution will be exactly what the user wants (1) as solution is not being generated by a third party (1) ○ user will know exactly how the system functions (1) so maintenance/adaptation of the solution later on should be simple (1) ○ relatively short time to implementation (1) as no external consultation required (1) ○ security of data (1) not seen by external agencies (1) • External software house bespoke (1) <ul style="list-style-type: none"> ○ there can be penalties for late delivery (1) as contract is in place (1) ○ availability of large skills base (1) i.e. individual/ company specializing in this type of system can be hired (1) ○ external team may have previous experience of a similar system (1) and so may provide a system in a shorter timeframe (1) ○ no need to employ specialist staff (1) who may not be required long term (1) 	

	<ul style="list-style-type: none">• Customise generic software (1)<ul style="list-style-type: none">○ cheaper than bespoke (1) while offering rich functionality / conformity to brand requirements (1)○ sufficient skills in-house (1) no need to employ outside help (1)<ul style="list-style-type: none">○ less time required to develop solution (1) using customising tools (1) <p style="text-align: right;">4 x (3,2,1,0) marks</p>	
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<p>10</p>	<p>14.2 Evaluation of Software</p> <p><i>A pet shop manager needs an ICT consultant to evaluate a number of stock control packages. You wish to be considered for this work.</i></p> <p><i>Write a letter to the manager of the pet shop about what you would do, paying particular attention to:</i></p> <ul style="list-style-type: none"> • <i>the procedures that you would use to evaluate the packages</i> • <i>example evaluation criteria that you would use</i> • <i>the content of the evaluation report that you would submit.</i> <p>The quality of written communication will be assessed in your answer.</p>	<p><i>(20 marks)</i></p>
	<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>The procedures that you would use to evaluate the packages (code as P) maximum 6 marks</p> <p>Example evaluation criteria that you would use (code as E) maximum 6 marks</p> <p>The content of the evaluation report that you would submit (code as R) maximum 6 marks</p> <p style="text-align: right;">Maximum mark for content is 16/20</p> <p>Quality of written communication (code as Q) maximum 4 marks</p> <p>The procedures that you would use to evaluate the packages (P marks) One mark for procedure and up to 2 marks for expansions (P).</p> <ul style="list-style-type: none"> • Establish client/user needs (1) eg by observing use of current system (1) • Establish software capabilities (1) eg by benchmark testing (1) • Match needs to capabilities (1) eg by weighting grading criteria data to award scores to solutions (1) <p style="text-align: right;">Max 6 marks</p>	

	<p>Example <u>e</u>valuation criteria that you would use (E marks)</p> <p>One mark for evaluation criterion and second for expansion (E).</p> <p>MAX 4 Marks for any 4 grading criteria without expansions:</p> <ul style="list-style-type: none"> • agreed problem specification (1)(1) • functionality (1)(1) • performance (1)(1) • usability (1)(1) • compatibility with existing software base (1)(1) • transferability of data (1)(1) • robustness (1)(1) • user support (1)(1) • resource requirements including hardware, software and human (1)(1) • upgradability (1)(1) • portability (1)(1) • financial issues / development cost / development opportunities (1)(1) <p style="text-align: right;">Max 6 marks</p> <p>The content of the evaluation <u>r</u>eport that you would submit (R marks)</p> <p>One mark for content item or expansion / explanation (R)</p> <ul style="list-style-type: none"> • The methodology to be used (1) eg to inform the client how the evaluation was done (1) • Actual evaluation (1) eg advantages and disadvantages of different solutions (1) • Recommendations (1) eg which solution best fits clients needs (1) • Justification (1) eg how evaluation was interpreted to arrive at recommendations (1) <p style="text-align: right;">Max 6 marks</p>	
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The Quality of Written Communication (Q marks)	
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. In addition, question 10 requires a simple 'letter' format presentation.
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.
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.
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.