



General Certificate of Education

Information and Communication Technology 5521

Unit 2 Information: Management and Manipulation

Mark Scheme

2007 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: Management and Manipulation/Unit 2

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 11.5 – Manipulation and/or Processing</p> <p><i>State two modes of processing and, for each one, give a suitable example of its use.</i></p>	<i>(4 marks)</i>
	<ul style="list-style-type: none"> • Batch (1) example e.g. payroll (1) • Interactive (1) example e.g. Internet banking (1) • Transaction/Pseudo-real-time (1) example e.g. airline ticket booking (1) • Real-time (1) example e.g. control of nuclear power plant (1) <p>Any 2 x (2, 1, 0)</p>	

2	<p>Topic 11.1 – Data Capture</p> <p><i>Data can be encoded and encrypted.</i></p> <p><i>(a) Describe what data encoding means.</i></p> <p><i>What is meant by the term encryption?</i></p>	<i>(2 marks)</i> <i>(2 marks)</i>
	<p>(a)</p> <ul style="list-style-type: none"> • Conversion of data to a machine readable form/binary • So that the computer can understand/process it • e.g. ASCII, Bitmap etc Allow any file format <p>Max 2</p> <p>(b)</p> <ul style="list-style-type: none"> • Scrambling of data/secret code • Prevention of data being viewed in an understandable form • Without a decryption key • Thus preventing unauthorised access to the data <p>Max 2</p>	

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3	<p>Topic 11.10 – Human/Computer Interface</p> <p>(a) Most mobile phones make use of a menu driven interface. Give two benefits of a menu driven interface for mobile phone users.</p> <p>(b) State two other types of user interface and give a suitable example of use for each one.</p>	<p>(2 marks)</p> <p>(4 marks)</p>
	<p>(a)</p> <ul style="list-style-type: none"> • Mistakes reduced as only correct choices displayed • Can select with single key stroke • Hierarchical menu structure aids navigation • Little or no training required as intuitive to use / once one menu driven interface is understood then others are very similar to use <p>Max 2</p> <p>(b)</p> <ul style="list-style-type: none"> • GUI (1) example e.g. QBE, Internet browser, operating system (1) • Command driven (1) example e.g. operating system (1) • Natural Language (1) example e.g. search engine(1) • Form based interface (1) example e.g. online shopping (1) <p>Any 2 x (2, 1, 0)</p>	

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4	<p>Topic 11. 8 – Security of Data</p> <p><i>All the employees of a company have to use an eight-character password to access the company’s computer network. The employees have been given a set of rules that they should follow to ensure that the password system is an effective security measure.</i></p> <p>(a) <i>State two rules that an employee should follow when choosing his password.</i></p> <p>(b) <i>State two rules that an employee should follow to ensure that his password is kept secret.</i></p> <p>(c) <i>State one procedure that an employee should follow to ensure that the network cannot be accessed without entering a correct password.</i></p>	<p>(2 marks)</p> <p>(2 marks)</p> <p>(1 mark)</p>
	<p>(a)</p> <ul style="list-style-type: none"> • Passwords should not contain information that could be guessed by others or reverse • Passwords should contain both letters and numbers/ other characters • Passwords should contain both upper and lower case letters • Passwords should not contain consecutive repeated letters • Employees should have a different password for each system that they use <p>Max 2</p> <p>(b)</p> <ul style="list-style-type: none"> • Employees should not deliberately disclose passwords • Employees should not carelessly reveal passwords • ALLOW Passwords should be changed regularly <p>Max 2</p> <p>(c)</p> <ul style="list-style-type: none"> • Employee should not leave his computer logged on whilst unattended • Employee should install a password protected screen saver • lock the work station <p>Max 1</p>	

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5	<p>Topic 11.4 – Software Nature, Capabilities and Limitations</p> <p>(a) Explain what the term system software means, and give an example of an item of system software.</p> <p>(b) Explain what the term generic package software means, and give an example of generic package software.</p> <p>(c) Explain what the term bespoke software means, and give an example of bespoke software.</p>	<p>(3 marks)</p> <p>(3 marks)</p> <p>(3 marks)</p>
	<p>(a)</p> <ul style="list-style-type: none"> • performs tasks that are required because a computer is used • controls the operation of a computer system • enables the computer system to be more efficient <p>Max 2</p> <ul style="list-style-type: none"> • Example e.g. operating system, peripheral driver <p>1</p> <p>(b)</p> <ul style="list-style-type: none"> • General purpose software • An applications package or description • that is appropriate to many areas • of day to day business operations ALLOW example <p>Max 2</p> <ul style="list-style-type: none"> • Example e.g. word processing software, spreadsheet software, database management software <p>1</p> <p>(c)</p> <ul style="list-style-type: none"> • Specially written/tailor made software • For a <u>specific</u> customer • May include unusual hardware <p>Max 2</p> <ul style="list-style-type: none"> • Example e.g. ordering system for a large company <p>1</p>	

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6	<p>Topic 11.9 – Network Environments</p> <p><i>A company is having a sixteen-station Local Area Network (LAN) installed.</i></p> <p>(a) <i>Describe what is meant by the term Local Area Network.</i></p> <p>(b) <i>Give two suitable topologies for the LAN and, for each one, draw a labelled diagram to show its structure.</i></p> <p>(c) <i>State three items of hardware and/or software that could be needed if the LAN is to be connected to the Internet.</i></p>	<p>(2 marks)</p> <p>(6 marks)</p> <p>(3 marks)</p>
	<p>(a)</p> <ul style="list-style-type: none"> • Two or more computers linked together communicating / sharing resources • A network that is restricted to a single site/building/campus • physical connection is possible e.g. cable/UTP/fibre optic cable but wireless can be used • allowing high speed transmission of data <p>Max 2</p> <p>(b)</p> <ul style="list-style-type: none"> • Star (1) suitable diagram(1) labelled (1) Max 1 if topology not named or named incorrectly • Ring (1) suitable diagram (1) labelled (1) Max 1 if topology not named or named incorrectly • Bus (1) suitable diagram (1) labelled (1) Max 1 if topology not named or named incorrectly <p>Any 2 x (3, 2, 1, 0) Max 6</p> <p>(c)</p> <ul style="list-style-type: none"> • Router • Firewall • Modem • (Web) browser software • email software • anti-spyware/anti-virus software • ALLOW telephone socket or phone line <p>Max 3</p>	

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7	<p><i>Topic 11.7 – Hardware: Nature, Capabilities and Limitations</i></p> <p><i>A company is replacing the personal computers used by its employees. Each employee has been offered the choice of a laptop or a desktop computer.</i></p> <p><i>For each of the following types of computer, describe one advantage to an employee of choosing it. Your advantages must be different in each case:</i></p> <p><i>(a) A laptop computer.</i></p> <p><i>(b) A desktop personal computer.</i></p>	<p><i>(2 marks)</i></p> <p><i>(2 marks)</i></p>
	<p>(a)</p> <ul style="list-style-type: none"> • Can be used with battery power/ does not need to be plugged in (1) can be used anywhere on the move (1) • Portable (1) can take work home etc (1) • Can be folded away when not in use (1) more desk space available for other work (1) • Other clearly identified (1), well argued points (1) <p>1 × (2, 1, 0)</p> <p>(b)</p> <ul style="list-style-type: none"> • Larger/ clearer screen (1) less eyestrain (1) • More local disk storage (1) as can have several hard drives (1) • Range of peripherals permanently available (1) greater flexibility of use/ e.g. (1) • Less cramped keyboard (1) problems with RSI less likely (1) • Better performance (1) for budget allocated (1) • Other clearly identified (1), well argued points (1) <p>1 × (2, 1, 0)</p>	

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8	<p>Topic 11.3 Organisation of Data for Effective Retrieval Topic 11.2 Verification and Validation</p> <p><i>A human resources department stores details of staff in two flat files. One file is used to keep personal details, and the other file is used to keep records of training undertaken by members of staff.</i></p> <p><i>The file structures are shown below.</i></p> <p>Staff File</p> <p><i>(<u>StaffNumber</u>, Forename, Surname, Address, HomePhoneNo, StartDate, Department, ExtensionNo)</i></p> <p>Training File</p> <p><i>(<u>StaffNumber</u>, Department, Forename, Surname, TrainingCourseNo, TrainingCourseDescription, TrainingCourseDate)</i></p> <p><i>The underlined fields are the primary key fields in each file.</i></p> <p>(a) <i>Describe, using examples from the above files, two problems that could occur due to using separate files to store the data.</i></p> <p>(b) <i>Design an efficient relational database structure for the above data. Use three tables named:</i></p> <p style="margin-left: 40px;"><i>Staff</i> <i>TrainingCourse</i> <i>TrainingUndertaken</i></p> <p style="margin-left: 40px;"><i>Clearly identify your primary key for each table.</i></p> <p>(c) <i>For each of the fields below, name a validation check and state why it is suitable to use with that field. Each validation check must be different.</i></p> <p style="margin-left: 40px;">(i) <i>StartDate</i> (ii) <i>StaffNumber</i> (iii) <i>Department</i></p>	<p>(6 marks)</p> <p>(5 marks)</p> <p>(2 marks) (2 marks) (2 marks)</p>
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	<p>(a)</p> <ul style="list-style-type: none"> • Unnecessarily duplicated/repeated/redundant data (1) forename /surname/ department (1) in both files (1) • Inconsistency of data (1) forename and surname (and department) (1) can be different in files/ files have to be updated separately (1) <p>Any 2 x (3, 2, 1, 0) 6</p> <p>(b)</p> <p>Staff Table (<u>StaffNumber</u>, Forename, Surname, Address, HomePhoneNo, StartDate, Department, ExtensionNo) primary key (1) all other fields correct ALLOW extra relevant fields (1)</p> <p>TrainingCourse Table (<u>TrainingCourseNo</u>, TrainingCourseDescription, TrainingDate) primary key (1) other fields correct (1)</p> <p>TrainingUndertaken Table (<u>TrainingCourseNo,StaffNumber</u>) primary key identified and NO other fields(1) or ALLOW</p> <p>TrainingUndertaken Table (<u>TrainingUndertakenNo</u>, TrainingCourseNo,StaffNumber)</p> <p>OR TrainingCourse Table (<u>TrainingCourseNo</u>, TrainingCourseDescription) primary key (1) other field correct (1)</p> <p>TrainingUndertaken Table (<u>TrainingCourseNo,StaffNumber,TrainingDate</u>) primary key identified and NO other fields (1)</p> <p>5</p> <p>(c)</p> <ul style="list-style-type: none"> • [StartDate]Format check/Range check/Length check/Presence check (1) description (1) //Drop Down List/Pop up Calendar(1) Offer correct choices (1) • [StaffNumber] Type check/Uniqueness check/Presence check/ Length Check/Format check (1) description (1) //Offer correct choices (1) drop down list (1) • [Department] Offer correct choices (1) drop down list (1) // Presence check/Length check (1) description (1) <p>3 x (2, 1, 0)</p>	
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