**INFORMATION TECHNOLOGY** **9626/11**

Paper 1 Theory **May/June 2018**

MARK SCHEME

Maximum Mark: 90

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

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This document consists of **10** printed pages.

## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

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GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

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GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

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GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

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GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

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GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

| Question | Answer | | Marks |
|---|---|---|---|
| 1 | Data consists of raw facts and figures. | ✓ | **4** |
| | Information when processed becomes data. | | |
| | Data is a collection of text, numbers, symbols, images or sound. | ✓ | |
| | Data does not need to have meaning to become information. | | |
| | Knowing that 159.5, 164.3, 162.9 and 172.3 are the heights in centimetres of pupils in a school makes it a set of data. | | |
| | Data cannot be interpreted until it is organised. | ✓ | |
| | Data is never represented by binary in a computer. | | |
| | Data must have a context to become information. | ✓ | |
| | Data is the result of processing information, usually by computer. | | |
| | A group of facts which are used in context is called a set of data. | | |

| Question | Answer | | Marks |
|---|---|---|---|
| 2 | A mouse is essential for entering commands when using a command line interface. | | **4** |
| | Computer beginners often prefer to use a command line interface. | | |
| | A graphical user interface does not require the user to learn many commands off by heart. | ✓ | |
| | Users can only draw charts when using a graphical user interface. | | |
| | A graphical user interface consists of windows, icons, menus and pointers. | ✓ | |
| | A microphone is needed to input commands into a dialogue interface. | ✓ | |
| | A dialogue interface requires the user to be a computer expert. | | |
| | A gesture based interface does not require the use of any input devices. | | |
| | A gesture based interface usually concentrates on face and hand movements | ✓ | |
| | The time taken for a command to be given and the response appearing on the screen is not important in a dialogue based interface. | | |

| Question | Answer | Marks |
|---|---|---|
| 3(a) | **Three** *from:*<br><br>Can use ctrl key and other keys to save, print, copy and paste text, find and replace text<br>Can use arrow keys, home, end, page up and page down to navigate through text<br>Can use tab key to indent, delete key to delete forwards, backspace to delete backwards<br>Can use the alphabetic keys to enter the text of the book. | **3** |
| 3(b) | Dot matrix printer – cheaper to run/ink ribbon is cheaper than cartridges/toner/do not have to refill paper as frequently as the others/ribbon does not need changing as often as the others<br>Inkjet printer – faster to print out work than dot matrix/better quality output than dot matrix<br>Laser printer – do not have to change toner as often as inkjet cartridges/better quality output than dot matrix. | **3** |

| Question | Answer | Marks |
|---|---|---|
| 4 | **Six** *from*:<br><br>The global digital divide is the different levels of access of countries to modern information and communications technology<br>Less industrially developed nations cannot afford to invest as much in technology as more well developed countries<br>It does not necessarily mean that a nation does not have technology just a difference in the type of technology<br>This technology can include the telephone, television, personal computers and the internet<br>Not all countries are able to keep up with the constant changes in technology<br>There is a large inequality worldwide in terms of the distribution of installed telecommunication bandwidth/some countries may not have a well-developed broadband infrastructure/rely on dialup connections<br>The majority of the globally installed bandwidth is spread among a tiny number of countries<br>Some countries may have lower-performance computers<br>Some may have difficulty in obtaining technical assistance. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 5 | **Six** *from*:<br><br>A virtual private network<br>Is not physically a private network<br>It uses the internet or another WAN to transmit data<br>The data remains encrypted throughout transmission<br>Data is only decrypted at the destination computer<br>This process is called tunnelling as it uses a secure means to tunnel through a publicly accessible network<br>Uses public telecommunication systems<br>Normally consists of LANs that may be remote from each other...<br>...such as different branches of an organisation<br>It enables organisations to communicate over a large area<br>It is cheaper than creating a conventional WAN<br>The security used consists of firewalls, encryption, the use of IP security (IPsec). | **6** |

| Question | Answer | Marks |
|---|---|---|
| 6 | **Six** *from*:<br><br>Knowledge base comprises a database of facts and a rules base<br>A database of facts is built up by the engineer on information and knowledge of the subject specialists (experts)...<br>...also data from databases that may exist for the topic<br>Rules base is a set of rules which are usually of the form IF . . . THEN<br>The shell often includes the user interface, explanation system, inference engine and knowledge base editor<br>Inference engine is the reasoning part of the system<br>The method used by the inference engine involves the use of forward chaining, backward chaining or a combination of both<br>User interface is how the computer interacts with the user, displaying questions and information on a screen/enables the user to type in answers to the questions<br>Knowledge base editing software/knowledge base editor enables the knowledge engineer to edit rules and facts within the knowledge base<br>Explanation system explains to a user the chain of reasoning used to arrive at a particular conclusion. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 7 | **Six** *from*:<br><br>A mental model is based on belief not facts<br>A mental model is what the user will describe in terms of what they need<br>The designer must produce a user interface which reflects the user's line of thought<br>It is a model of what users know/think they know about a system<br>Users create mental models very quickly, often before they even use the software or device<br>Users' mental models come from their prior experience with similar software or devices<br>If the designers of the user interface do not take the user's mental model into account then it is highly likely that it will be hard to learn and use<br>A user interface that matches the user's mental model will be easy to learn/it will take less time to learn<br>A user interface that matches the user's mental model will be easy to use<br>A user interface that matches the user's mental model will provide the user with transferable skills so…<br>…another interface using similar ideas will be just as easy to use<br>A user interface that matches the user's mental model enables the user to predict how to navigate the interface<br>Training can be used to change a user's mental model to fit the design of the interface. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 8(a) | Select G3:J4 | **1** |
| | Click the Name box at the left end of the formula bar | **1** |
| | Type Allowance and press enter | **1** |
| | Or | |
| | On the Formulas tab, in the Defined Names group, click Define Name | **1** |
| | In the New Name dialog box type Allowance | **1** |
| | In the refers to box type G3:J4 | **1** |
| 8(b) | =B11-HLOOKUP(D11,Allowance,2,0)<br><br>B11-             1 mark<br>HLOOKUP(D11,)    1 mark<br>Allowance,        1 mark<br>2, 0              1 mark | **4** |

| Question | Answer | Marks |
|---|---|---|
| 8(c) | =B11- (F11*VLOOKUP(C11,Rate,2,0))<br><br>B11- (F11*         1 mark<br>VLOOKUP(C11,)    1 mark<br>Rate,              1 mark<br>2, 0)              1 mark<br><br>Select cell G11 and choose Format, format cells – 1 mark<br>Click on currency – 1 mark<br>Select $ and 0 decimal places – 1 mark | **7** |

| Question | Answer | Marks |
|---|---|---|
| 9(a) | **Two** *from*:<br><br>This is the frequency at which sound samples are taken/number of samples in a given period of time<br>There is a minimum rate at which samples need to be taken in order to faithfully reproduce the original signal<br>Decreasing sampling rate can lead to distortion of the original. | **2** |
| 9(b) | **Two** *from*:<br><br>The number of bits used to carry the data in each samples of sound usually, 8 or 16 bits<br>Decreasing sound sample resolution results in lower quality<br>It can reduce file size and save storage space. | **2** |
| 9(c) | **Two** *from*:<br><br>Cuts part of the sound out reducing the length of the track<br>Reduces file size<br>Enables unwanted sounds to be removed. | **2** |

| Question | Answer | Marks |
|---|---|---|
| 10(a)(i) | **Five** *from*:<br><br>Open the create… query design<br><u>Select</u> all fields except Discount<br>Under Code field next to criteria row<br>Type in square brackets [Enter required code]<br>Under Group size field next to criteria row<br>Type in square brackets [Enter required group size] | **5** |
| 10(a)(ii) | 10, 14 and 7 | **2** |

| Question | Answer | Marks |
|---|---|---|
| 10(b) | Select Duration and set up a lookup table | **1** |
| | With the values 7, 10, 14, 21 | **1** |
| | Click the arrow to activate the drop down list | **1** |
| | Select the appropriate value from the list. | **1** |
| 10(c) | Insert rows, above the data exported, for the Lookup table | **1** |
| | In adjacent columns/rows type in values for names of countries and codes | **1** |
| | Insert a column to the left of the data exported | **1** |
| | In the cell adjacent/to the left of the group size type in the VLOOKUP/HLOOKUP formula | **1** |
| | Replicate this formula down for all countries. | **1** |

| Question | Answer | Marks |
|---|---|---|
| 11 | This question to be marked as levels of response:<br><br>**Level 3 (7–8 marks)**<br>Candidates will explain the advantages and disadvantages of control technologies using relevant and appropriate examples.<br>The information will be relevant, clear, organised and presented in a structured and coherent format.<br>There may be a reasoned conclusion/opinion.<br>Specialist terms will be used correctly and appropriately.<br><br>**Level 2 (4–6 marks)**<br>Candidates will explain the advantages and disadvantages of more than one control technology.<br>Examples used will be for the most part relevant.<br>For the most part, the information will be relevant and presented in a structured and coherent format.<br>There may be a conclusion/opinion.<br>Specialist terms will be used appropriately and for the most part correctly.<br><br>**Level 1 (1–3 marks)**<br>Candidates will only address some aspects of the use of control technology and either advantages or disadvantages.<br>Examples, if used, may lack relevance.<br>There will be little or no use of specialist terms.<br><br>**Level 0 (0 marks)**<br>Response with no valid content.<br><br>Candidates may refer to e.g.:<br><br>Computer controlled production lines using robots instead of humans has increased unemployment<br>Computer-controlled printing presses have replaced many print workers<br>IT Technicians are needed to maintain computers and robots increasing employment<br>Programmers are needed to program computers and robots<br>However, number of new jobs is far less than old jobs lost<br><br>Microprocessor-controlled devices in the home allow people to have more leisure /free time instead of doing household work<br>Burglar alarms give people a greater sense of security<br>Can lead to people becoming lazy/over reliant on microprocessor-controlled devices in the home<br>There has been a loss of manual household skills due to increase in use of microprocessor-controlled devices in the home<br><br>Traffic lights – fewer traffic jams than manually controlled<br>Street lights – more economical – only come on when needed<br>Air conditioning units in shopping malls make shopping a more comfortable experience…<br>…but increases costs for stores…<br>…and therefore prices to the customer. | 8 |

| Question | Answer | Marks |
|---|---|---|
| 12 | **Eight** *from*:<br><br>*Benefits*<br>It is relatively easy to communicate with anybody locally or anywhere in the world regardless of where they are<br>You can respond to friends quickly<br>Messages can be received quickly<br>The cost of sending messages by email/social networking/ instant messaging is very low unlike postage or normal phone calls<br>The cost of using VOIP is very low unlike postage or normal phone calls<br>An email can be sent to many people at the same time<br>Using internet to send messages saves time as do not have to spend time visiting/being on the phone to somebody<br>Emails can be responded to when it is convenient<br><br>*Drawbacks*<br>Students can spend too much time on social network sites rather than studying<br>Spam emails can be received which use up storage space<br>Phishing emails can trap you into giving out personal information<br>Viruses can be sent by email<br>With email/messaging is sometimes difficult to clarify what is meant unlike a normal phone call<br>Not everyone has an internet connection<br>Email/messaging – confidential information can be easily forwarded and if done in error could easily end up in the wrong hands. | 8 |