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Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

INFORMATION TECHNOLOGY **9626/13**

Paper 1 Theory **October/November 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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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.

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.

GENERIC MARKING PRINCIPLE 2:

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

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.

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.

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).

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.

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Question	Answer	Marks
1		4

Peer-to-peer networks must have a central server.	
Client-server networks generally offer greater security than peer-to-peer networks.	✓
Peer-to-peer networks can support millions of users with no loss of performance.	
The server will determine which users can access the files on a client-server network.	✓
In a client-server network each client functions both as a client and as a server simultaneously.	
If one computer crashes it has no effect on the other users in a client-server network.	✓
A client-server network is cheaper to set up than a peer-to-peer network.	
Peer-to-peer networks always require an employee to manage the network.	
In a peer-to-peer network only one computer is allowed the printer.	
In a peer-to-peer network computers can communicate and share files with every other computer on the network.	✓

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Question	Answer	Marks
2		4

The colours used in a dialogue interface are of key importance.	
A mouse is an essential input device when using a command line interface.	
A graphical user interface requires you to type in a large number of instructions.	
A command line interface is mainly used by more advanced computer users.	✓
A gesture based interface allows users to point with their fingers as a method of input.	✓
A command line interface needs menus and icons to operate it.	
A dialogue interface can interpret hand movements to carry out commands.	
A gesture based interface is very reliable as most users have similar gestures for communicating.	✓
The font size is the most important feature of a command line interface.	
A graphical user interface involves the use of windows and pointers.	✓

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Question	Answer	Marks
3	**Eight** *from:* The purpose of storage devices is to store data and software for later use The purpose of storage devices is to hold data even when the computer is turned off so the data can be used whenever needed/to have non-volatile/permanent/backup copies of data/keep archives Stored data may be loaded back into the CPU for further processing or sent to an output device The device writes data to the medium and reads it from the medium The CPU is able to write data to the hard disk/tape in the form of formatted files The CPU is also able to read data and software from the hard disk/tape in readiness for processing to take place There is no distinction between software and data as far as the storage device is concerned – both are a form of digital data Optical devices such as CD, DVD and Blu-Ray drives all make use of a laser to burn dark pits onto the medium Each dark pit is a binary digit e.g. 1 whilst the absence of a pit is the opposite binary bit e.g. 0 if the pit is a 1 Small areas of a tape/disk are magnetised to represent 1 or 0 Hard disks and magnetic tape have surfaces coated with a magnetically sensitive material such as iron oxide Solid state drives make use of electrical charge to store the data Reading data involves retrieving data from the surface and transferring it into the computer's memory for use.	**8**

Question	Answer	Marks
4	**Six** *from:* Lack of understanding of the relevance and benefits of broadband Lack of skills/education about/knowledge of/familiarity with information technologies, or confidence to use them Affordability of connection and access fees Affordability of devices with which to access broadband Tend to live in rural areas where broadband infrastructure is not as good as in cities Government programmes to implement education Stimulate initiatives such as the development of e-government, e-health, e-learning and e-business, aimed at encouraging the development and use of new broadband applications Extend faster broadband to rural areas.	**6**

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Question	Answer	Marks
5	**Four** *from:* It can be expensive to buy the software/bring in expertise Sometimes there is not sufficient data to produce a mathematical model The simulator response will not always be exactly the same as an actual situation, as there may be too many variables Complex simulations can require a computer system with a fast processor/large amounts of memory which is very expensive An event that may occur instantaneously in the real world may actually take hours to imitate in a simulated environment The reduction of simulation time may be based on oversimplification of assumptions Users may be given a false sense of security and not react well in the real situation.	**4**

Question	Answer	Marks
6(a)	**Three** *from:* Easier for students to complete Essential details can be pre-printed so easier to identify candidate Faster to mark scripts More accurate marking of scripts Graphs/statistics are more easily produced.	**3**
6(b)	**Three** *from:* Students cannot express themselves as easily/OMRs cannot read text/extended answers Answers are not so easily human readable/harder for teacher to analyse answers Questions cannot be open ended/do not allow variety of answers Equipment is expensive to purchase/setting up is expensive.	**3**

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Question	Answer	Marks
7	**Three** matched pairs *from:* Overloading sockets causing overheating and therefore fire CO_2 fire extinguisher in the room/separate sockets for each plug Water spilt on to live wires/handling bare wires can cause electrocution Do not allow food and drink into the computer room/keep computers away from water supply/ensure regular inspection by electrician/ensure all wires are properly insulated Trailing cables can cause users to trip up and injure themselves Ensure proper trunking is in place/keep cables under carpets/use Wi-Fi Heavy objects can fall off tables and cause injury Ensure sturdy desks or tables are used / heavy objects are placed in the centre of tables. 1 mark for description of issue and 1 for prevention.	**6**

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Question	Answer	Marks
8	**Two** points from each section: General public: More people are able to use personal video-conferencing systems as equipment/broadband has become affordable to the general public More people are able to use personal video-conferencing systems as hardware has improved in quality Availability of freeware has made software-based video-conferencing accessible to many Enables more people to stay in contact with family/friends when far apart/when it is difficult to travel Hard-of-hearing/people with speech difficulties use video-conferencing as a means of communicating with each other in sign language Can result in loss of social interaction Medicine: Patients who are bed-ridden may contact nurses and physicians (to show symptoms) Doctors and/or other paramedical professionals can discuss cases across large distances Rural areas can use this technology for diagnostic purposes Doctors can teach student doctors/student doctors can observe surgical operations Education: Video-conferencing provides students with the opportunity to learn by participating with students from other countries/schools Teachers and lecturers worldwide can be virtually brought to remote or otherwise isolated educational facilities Students who are ill can still take part in lessons Students from diverse communities and backgrounds can come together to learn about one another Through video-conferencing, students can virtually visit museums and educational facilities Universities with several campuses can collaborate and share lecturers.	**6**

Question	Answer	Marks
9(a)	=IF(C4>500,(C4-500)*0.1,"") =IF() – 1 mark C4>500, – 1 mark (C4-500) – 1 mark *0.1 – 1 mark ,"" – 1 mark	**5**

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Question	Answer	Marks
9(b)	=SUMIFS(E3:E14,C3:C14,">800",B3:B14,"Adults") =SUMIFS() – 2 marks (SUMIF() – 1 mark) as first part of formula E3:E14 as first part of bracketed formula – 1 mark ,C3:C14 – 1 mark ,">800" – 1 mark ,B3:B14 – 1 mark ,"Adults" – 1 mark	**7**
9(c)	=COUNTBLANK(E3:E14) COUNTBLANK() – 1 mark E3:E14 – 1 mark	**2**
9(d)	**Five** *from:* Highlight columns A to G Use format tool and column width tool and enter 20 Highlight column F, use format tool and column width tool and enter 12 / move cursor over right hand edge of letter F and drag to 12pt Highlight cells C3:G16 and select format and format cells Select currency Choose symbol (format) $ and enter 0 for decimal places.	**5**

Question	Answer	Marks
10(a)(i)	Reg_No = “L*” Reg_No = – 1 mark “L*” – 1 mark	**2**
10(a)(ii)	Make = “Frod” AND Colour = “Blue” Make = “Frod” – 1 mark AND Colour = “Blue” – 1 mark	**2**
10(a)(iii)	Model = “Eagle” AND NOT Colour = “Black” Model = “Eagle” – 1 mark AND NOT – 1 mark Colour = “Black” – 1 mark	**3**
10(b)	**Two** *from:* Sorted on Doors descending… …followed by sorted on Make ascending… …followed by sorted on Reg_No ascending.	**2**
10(c)	Reg_No – it has unique values/no duplicated values – 1 mark There are 3 occurrences of BMS or other suitable example/2 2000s/2 7 doors/2 greens – 1 mark	**2**

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Question	Answer	Marks
11	**Eight** *from:* Advantages: Any change to one record which is needed can instantly be made to any related records The database does not have redundant data making the file size smaller so less money needs to be spent on storage There is no data duplication so there are fewer errors in the data There is no data duplication so there is less chance of storing incorrect copies of the data Modifying a table is easier as there is less data to modify Disadvantages: A larger number of tables requires more relationships to be designed taking more time Making data atomic may not always be the best solution such as date of birth can be separated into day, month and year but this may serve no purpose Data may be stored as codes rather than meaningful data making it difficult for humans to read/level of detail can be lost With more tables setting up queries can become more difficult You can end up with more tables than an un-normalised database making it difficult to keep track of data May require greater expertise (which may need to be bought in).	**8**

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Question	Answer	Marks
12	This question to be marked as levels of response: **Level 3 (7–8 marks)** Candidates will discuss the importance of encoding data including the advantages and disadvantages. Candidates will explain the effectiveness of the main methods of coding in detail. The information will be relevant, clear, organised and presented in a structured and coherent format. There may be a reasoned conclusion/opinion. Specialist terms will be used correctly and appropriately. **Level 2 (4–6 marks)** Candidates will discuss the advantages and disadvantages of encoding data. Candidates will describe the main methods of encoding in detail. For the most part, the information will be relevant and presented in a structured and coherent format. There may be a conclusion/opinion. Specialist terms will be used appropriately and for the most part correctly. **Level 1 (1–3 marks)** Candidates will present advantages or disadvantages of encoding data. Candidates will describe at least one method of encoding in detail. There will be little or no use of specialist terms. **Level 0 (0 marks)** Response with no valid content. Candidates may refer to e.g. Coding of data is the reducing the length of data Encryption is the scrambling of data into meaningless groups of symbols Codecs are hardware/software needed to convert data so that it can be transmitted down communication lines Coding: speeds up data entry uses less storage space enables faster searching for data increases the accuracy of data entry data is easier to validate coarsening of data – light blue/dark blue can both have same code Is difficult to code value judgements coding can obscure the meaning of the data	**8**

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Question	Answer	Marks
12	Encryption: It allows protection of sensitive data such as credit card numbers and personal information from computer hackers Without encryption information could be intercepted and altered or misused by outsiders It can be used to create digital signatures to authenticate e-mail If the encryption key is lost the data is effectively lost Encrypting data and creating the keys necessary to encrypt and decrypt the data requires expensive systems Public key encryption is based on complicated mathematics so computers have to work very hard to both encrypt and decrypt data using the system making such systems very slow Many systems use a third party to certify the reliability of public keys and if the certification authority is compromised, the criminal that did it could issue false certificates fooling people into sending data Users can have a false sense of security forgetting that once the data is decrypted it becomes vulnerable to attack again Codecs: Video and music files are large so are difficult to transfer across the Internet quickly Without codecs, downloads would take three to five times longer than they do now There are many different types of codec and it is not always clear which codec to get to play the video/music files It is common to need ten to twelve codecs to play a user's music and movies There is always loss of quality.	