Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

INFORMATION TECHNOLOGY **9626/12**

Paper 1 Theory **March 2017**

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 will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the March 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

Question	Answer		Marks
1	The more information that is collected always improves its quality.		4
	Data collected from a third party always becomes high quality information.		
	The accuracy of the information collected affects its quality.	✓	
	Information which costs a lot to collect is always high quality information.		
	A great deal of detail can sometimes lead to poor quality information.	✓	
	Irrelevant information leads to poor quality information.	✓	
	The problems arising from a lack of good quality information can be overcome by making your queries more refined.		
	Good quality of information is always obtained from small groups of people.		
	Information collected 100 years ago is always good quality information.		
	The more complete the collected information is, the better its quality.	✓	

Question	Answer		Marks
2	Encryption is used by hackers to discover passwords.		4
	Encrypting a hard disk prevents viruses from deleting the information.		
	Encryption always makes use of a public key and a private key.		
	Encryption is the scrambling of the text in a message.	✓	
	Encryption is the process of encoding messages in such a way that only authorised parties can understand them.	✓	
	Encryption prevents messages from being intercepted.		
	Encrypted information can only be understood if decrypted.	✓	
	Encryption has speeded up internet browsing by using secure sites.		
	The recipient can only decrypt the message with the key provided by the originator.	✓	
	All memory sticks are encrypted.		

Question	Answer	Marks
3	***Five** from:* They are just a collection of text, numbers and symbols… …with no meaning A possible **context is that the data is about the student** and represents… …their family name, first name, student id, their latest maths mark and their date of birth (**three** marks for five reasonable fields, **two** marks for four reasonable fields, **one** mark for two or three reasonable fields)	**5**

Question	Answer	Marks
4	***Eight** from:* Users with physical handicaps may not be able to use a keyboard or mouse… …or control their limbs accurately… …could speak into a microphone to control a device For reasons of hygiene a doctor may not be allowed to touch a display or device Appropriate gestures/speaking into a microphone are/is a more hygienic way to control the device Gestures may be a quicker way of initiating a response from a device Certain gestures may not be socially acceptable which is not a problem with the other interfaces Some gestures may be unintentional but still initiate a reaction from the device Dialogue interface allows hands free control ensuring safety when driving… …whereas gestures/GUI would need at least one hand to leave the steering wheel Dialogue interface can be more expensive to develop compared with a GUI Dialogue interface may not operate reliably if there is background noise or user has a cold/strong dialect/accent… …whereas GUI/gestures will still be reliable GUIs tend to be more accurate than gestures/dialogue Dialogue interface often requires a training session with user… …GUI/gestures can be taught through manuals Gesture based is less effective when several users/background movement involved *One mark is available for an appropriate reasoned opinion*	**8**

Question	Answer	Marks
5(a)(i)	Anti-virus software – ***Four*** *from:* Software used to prevent, detect and remove malicious software Can protect from: malicious Browser Helper Objects (BHOs), browser hijackers, ransomware, keyloggers, backdoors, rootkits, Trojan horses, worms, malicious LSPs, dialers, fraudtools, adware and spyware (must have at least two) Signature-based detection compares the contents of a file to its database of known malware signatures Heuristic-based detection detects malware based on characteristics typically used in known malware code Behavioural-based detection: is based on the behavioural fingerprint of the malware at run-time… …is only able to detect malware after they have starting doing their malicious actions Sandbox detection based on behavioural-based detection… …but doesn't detect the behavioural fingerprint at run time… …it executes the programs in a virtual environment logging what actions the program performs Gives user options to delete or quarantine files/asks if user wants virus deleted Scans computer/files/disk for viruses	**4**
5(a)(ii)	Data compression – ***Three*** *from:* Encoding information using fewer bits than the original representation Can be either lossy or lossless Lossless compression reduces number of bits by identifying repeated patterns of data No information is lost in lossless compression Lossy compression reduces number of bits by identifying unnecessary information Storage space required for file/file size is reduced	**3**
5(a)(iii)	Disk defragmentation – ***Three*** *from:* Organises the contents of the disk into the smallest number of contiguous regions/fragments Attempts to create larger regions of free space using compaction Some defragmentation utilities try to keep smaller files within a single directory together The movement of the hard drive's read/write heads over different areas of the disk when accessing fragmented files is slower… …compared to accessing the entire contents of a non-fragmented file sequentially	**3**
5(a)(iv)	Disk formatting – ***Two*** *from:* Prepares a data storage device for initial use Organises the tracks on a disk into sectors A new disk medium is fully prepared in order to store files The first stage is low-level formatting followed by… …partitioning which makes the data storage device visible to an operating system… followed by high-level formatting which generates a new file system	**2**

Question	Answer	Marks
5(b)	To be marked as a level of response: **Level 3 (7–8 marks)** Candidates will analyse and evaluate both sides of the argument and discuss/consider different reasons as to why the computers should be networked or not The issues raised will be justified The information will be relevant, clear, organised and presented in a structured and coherent format Subject specific terminology will be used accurately and appropriately There will need to be a reasoned conclusion to gain full marks **Level 2 (4–6 marks)** Candidates will analyse and evaluate both sides of the argument and discuss/consider different reasons as to why the computers should be networked or not although development of some of the points will be limited to one aspect of the question For the most part the information will be relevant and presented in a structured and coherent format Subject specific terminology will be used appropriately and for the most part correctly There may be a conclusion **Level 1 (1–3 marks)** Candidates may only address one side of the argument, and give basic reasons Answers may be simplistic with little or no relevance There will be little or no use of specialist terms **Level 0 (0 marks)** Response with no valid content Advantages may include e.g.: Easier for students to share work/files in group projects Easier for network manager to roll out new software Easier for teachers to monitor students when working Peripherals can be shared so fewer needed leading to lower cost in the future Can access the internet more easily School intranet would become available to all students more frequently Disadvantages may include e.g.: Easier for students to share work which could lead to copying Bigger server may be required to cope with extra computers so more expensive Extra network points may be needed which leads to more cost If the server breaks down student work might become inaccessible Viruses are easier to transmit from one computer to another	**8**

Question	Answer	Marks
6	***Six** from:* Provides past, present and prediction information Helps in decision making MIS manager typically analyses business problems MIS manager designs and maintains computer applications to solve the organisation's problems Helps with project management Managers use management information systems to gather and analyse information about various aspects of the organisation… …such as personnel, sales, inventory and production Management information systems are used to create reports on aspects such as sales, revenue and production Management information systems are used to create charts (on aspects such as sales, revenue and production) These reports are provided at regular intervals to managers at all levels to help them evaluate their companies' performance By comparing daily, weekly or monthly reports to previous reports, managers are able to spot trends, such as revenue growth or reduction By creating charts, can see trends such as revenue growth or reduction	**6**

Question	Answer	Marks
7(a)	***Two** from:* Transaction file is validated Transaction file must be sorted… …in same order as master file/sorted on Workers ID number	**2**
7(b)	***Six** from:* First record in the transaction file read belonging to 047006 Reads first record in the old master file belonging to 031597 These two records are compared If records do not match computer writes master file record to new master file Records do not match so next record of master file is read 047006 If it matches transaction is carried out Computer calculates the pay rate of pay × no. of hours worked, 55 × 40… …using rate of pay 55 from master file… …using hours worked 40 from transaction file Processed record is written to new master file Next record 131654 is read from transaction file then compared to next master file record 131654 This continues until the last record from the transaction file record 869891 is read After processing the last record of the transaction file 869891 all the remaining old master file records are written to the new master file in this case, one record 942378	**6**

Question	Answer	Marks
7(c)	Three matched pairs from:	
	Length check on Workers ID number	**1**
	Must be exactly 6 characters long	**1**
	Lookup check on Department	**1**
	Must be one of Foundry, Cold rolling, Tube production, Extrusion or Hot rolling	**1**
	Range check on hourly rate	**1**
	E.g. be between 50 and 65	**1**

Question	Answer	Marks
8(i)	***Three*** *from:* Select A3:B15… …Sort in descending order of column A… …Add a level… …Sort in ascending order of column B	**3**
8(ii)	***Three*** *from:* Select A3:B15… …Sort in ascending/descending order of column A …Add a level …Sort in ascending order of column B	**3**

Question	Answer	Marks
9	Static parameter query is a query that is fixed	**1**
	Five *from:* Every time that the query is run it will search for the surname “Johnson” If Theresa wants to look for another surname she will need to open up the query in design view… …and change the surname criteria to that name With a dynamic parameter query she could type in a different surname/data each time Every time the query is run a dialogue box would appear asking her to type in the surname This would save the time of designing the query every time she wanted to find a surname	**5**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>10</td><td>

***Two** from:*

Data such as Second subject and Third subject is repeated
Data is non-atomic as Name can be further subdivided

***Four** from:*

Split name into first name and second name
Each record to have two entries, one per subject e.g.

<table>
<tr><th>Student number</th><th>First name</th><th>Second name</th><th>Subject</th></tr>
<tr><td>1001</td><td>Eashan</td><td>Wadhwa</td><td>Chemistry</td></tr>
<tr><td>1001</td><td>Eashan</td><td>Wadhwa</td><td>Physics</td></tr>
</table>

There will still be columns with the same data in some rows but each row as a whole will be unique

Create a new table called subject
Each subject would have to have a unique id
Fields would be subject name and subject_id

</td><td>**6**</td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>11(a)</td><td>

=VLOOKUP(B8,C$2:D$4,2)

VLOOKUP() – 1 mark
B8, – 1 mark
C2:D4 – 1 mark
2 – 1 mark
Use of appropriate absolute referencing – 1 mark

</td><td>**5**</td></tr>
</table>

Question	Answer	Marks
11(b)	***Six** from:* In order to calculate the wage paid this week the Rate per hour paid has to be known then is multiplied by the hours worked this week– 1 mark Cell E8 should contain the rate per hour paid for a labourer – 1 mark **=VLOOKUP(B8,C$2:E$4,3)** VLOOKUP(B8…) – 1 mark C2:E4 – 1 mark 3 – 1 mark Use of appropriate absolute referencing in VLOOKUP – 1 mark Involves looking up Job Code in cells C2 to E4 and returns rate per hour from third column/column E Cell F8 should contain wage paid this week which is hours worked multiplied by rate per hour – 1 mark D8*E8 – 1 mark	**6**