Cambridge International AS & A Level

INFORMATION TECHNOLOGY	**9626/12**
Paper 1 Theory	**May/June 2020**
MARK SCHEME	
Maximum Mark: 90	

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

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

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.

This document consists of **11** 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.

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.

Question	Answer		Marks
1(a)	Symmetric encryption is a newer method of encryption compared to asymmetric encryption.		**1**
	With symmetric encryption the public key is used to encrypt the data.		
	With symmetric encryption you have to use the same key to encrypt every message.		
	Symmetric encryption only uses a single private key.	✓	
1(b)	With symmetric encryption the private key must be kept private by both the sender and the receiver.	✓	**1**
	Symmetric encryption is often referred to as public key encryption.		
	It is possible to deduce the private key from the public key.		
	With symmetric encryption anyone with a copy of the public key can encrypt information.		

Question	Answer		Marks
2(a)	It is easier to format paragraphs compared to database software	✓	**1**
	It is easier to manipulate statistics compared to using spreadsheet software		
	Word processing packages can be used to incorporate all multimedia features of a website		
	Databases are more difficult to filter than word processed documents		
2(b)	It is easier to create a query using database software rather than using spreadsheet software	✓	**1**
	It is easier to create a report using spreadsheet software than database software		
	It is harder to enter data and produce charts showing sales growth with a spreadsheet than using video editing software		
	The easiest way to trim a sound sample is by using photo editing software		

Question	Answer	Marks
2(c)	**Six** from: Advantages: Anyone who is familiar with the most common types of application software will be able to quickly learn how to use a web authoring package. There is no need to take the time to learn HTML code. Beginners will find it quicker to create a web page using a web authoring package. Some people find text editors more difficult to design pages in because they can't visualise how the page will look from just the HTML. Disadvantages: With web authoring packages the ALT attribute after an image statement is empty... ...it needs to contain a description of the image... ...visually challenged users have programs that read the site aloud which read the description. Web authoring packages often produce superfluous code which may contain errors. Professional web designers often switch to a text editor to correct the errors created by web authoring packages. Pages download slower because of extra code. **Must have at least one of each to gain full marks**	**6**

Question	Answer	Marks
3	**Six** from: 1 mark for each description and 1 for each matched example Data: Data consists of raw facts and figures which require processing for interpretation/it does not have any meaning until it is processed and given a context. The number 5 would be an item of data. Information: Information is data that is presented within a context that gives it meaning, relevance and purpose/Information is data that is accurate and timely, specific and organised for a purpose/Information is contextualised, categorised, calculated and condensed data. The context could be prime numbers and 5 is a prime number. Knowledge: Know-how and learning of contextualised information/knowledge is the appropriate collection of information, such that its intent is to be useful. Only when it is apparent that prime numbers have only two factors does this become knowledge	**6**

Question	Answer	Marks
4	**Six** from: Discourages access to illegal, harmful or inappropriate images or other content. Teaches students to be aware that unauthorised access to personal information can occur. Reduces the risk of being subject to grooming by those with whom they make contact on the internet. Discourages the sharing / distribution of personal images without an individual's consent or knowledge. Reduces inappropriate communication / contact with others, including strangers. Encourages students to report cyber-bullying by fellow students. Teaches students how to avoid unsuitable video / internet games. Teaches students how to evaluate the quality, accuracy and relevance of information on the internet. Discourages plagiarism and copyright infringement. Discourages illegal downloading of music or video files… …giving rise to the potential for excessive use which may affect the social and emotional development and learning of the student.	**6**

Question	Answer	Marks
5(a)	**Six from:** It saves schools having to pay for transporting students to visit other schools. It saves the time it takes to transport students to other schools. Students are less likely to misplace documents as electronic documents can be viewed online. It is safer as schools no longer have to send their students to meetings. It is more environmentally friendly as transport pollution is reduced. There can be poor quality of the video because of bandwidth problems leading to problems with time lag. Schools in remote areas may not have sufficient bandwidth to support video conferencing. Interruption to/ breakdowns of the transmission can occur as power cuts/outages are common in some countries. Difficult to allow participants to answer in turn as it might be difficult to see all participants. Students may be put off by the camera, as many people are self-conscious when being videoed.	**6**

Question	Answer	Marks
5(b)	**Three** from: Asymmetric digital subscriber line is a type of DSL broadband communications technology used for connecting to the internet. ADSL allows more data to be sent over copper cable than existing telephone lines. A microfilter is installed to allow both ADSL and telephone services to be used at the same time. ADSL requires a special ADSL modem. ADSL supports data rates of from 1.5 to 24 Mbps when downloading/downstreaming. Only from 16 to 640 Kbps upstream/upload speed.	3
5(c)	**Three** from: A set of media access control (MAC) and physical layer (PHY) specifications. Used to implement wireless local area network (WLAN) computer communication. Specifies an over-the-air interface between a wireless client and a base station/between two wireless clients. Used in the 900 MHz and 2.4, 3.6, 5, and 60 GHz frequency bands. Used in most home and office networks to allow laptops, printers, and smartphones to communicate with each other. Created and maintained by the Institute of Electrical and Electronics Engineers (IEEE) LAN/MAN Standards Committee (IEEE 802).	3

Question	Answer	Marks
6	**Six from:** Individuals who access someone's personal data can retrieve login details and commit identity theft. Fraudsters can take a person's banking information and make unauthorised withdrawals and transfers. People who announce their holidays/when they will not be home on social media can leave themselves open to burglary. Sharing personal information on social networks, such as likes and dislikes about politics, religion or their current job can hinder future job opportunities. Criminals can take business information from people who run their business online and create false email accounts and fake employee names. Credit card scams are on the rise when people use their credit cards for online shopping credit card numbers and security codes can be intercepted. Home insurance or life insurance could be denied if personal information about risky behaviors that person, or their home, is posted on social media sites. Criminals troll websites specifically looking for detailed medical information and use it to gain personal medical attention for themselves or to sell to others, leading to the owners of that information being denied medical attention due to unpaid debt.	6

Question	Answer	Marks
7(a)	**Two** from: A field that derives its data from the calculation of other fields. It contains a formula. The data are not entered into a calculated field by the user. It only contains data computed at run time. Weekly_pay is a calculated field – 1 mark	**3**
7(b)	**Three** from: Creates an index so records can be found quickly. Makes each record unique even if other identifying fields are identical such as first name and family name. Enables a search to go to the record directly without having to search through preceding records so faster search. Enables relationships to be formed if a relational database is to be created.	**3**
7(c)	**Two** from: A consistency check is a test performed to determine if the data has any internal conflicts. Detects whether the value of two or more data items are not in contradiction. Data items which are related in some way can be checked for the consistency of their relationship. Checks fields to ensure data in these fields correspond to each other. **Three** from: Job_type and Hourly_rate are related. For example, both mechanics earn 20.00, all painters earn 18.00 etc. (allow one example). When the hourly rate is entered the check would make sure the Job_type matches. When the Job_type is entered the check would make sure that the Hourly_rate matches. An error message would appear if this is not the case.	**5**

Question	Answer	Marks
8	**Two** matched pairs from Electric shock from spilling liquids on to computer wires/touching bare wires/ use a circuit breaker. Do not bring food and drink near computers/Ensure wires are properly insulated. Fire from overloading power sockets. Use a multi-pin adaptor/use a circuit breaker. Tripping over loose cables. Ensure cables are tied up/properly trunked. Equipment falling and <u>injuring someone.</u> Ensure equipment is not overhanging edge of table/use sturdy tables.	**4**

Question	Answer	Marks
9	**Eight** from Bar code reader is used to read bar codes from the products. Number pad would be used to input the bar code if the bar code was damaged and could not be read by bar code reader. Number pad would be used in conjunction with bar code reader for entering the number of items with that bar code. Entering number on number pad would be quicker than scanning several identical bar codes. Chip and PIN reader to read details from customer's bank card. Contactless card reader to read details from customer's bank card. Chip and PIN reader more secure than contactless reader. In many countries contactless method is only allowed for transactions less than a certain amount. Chip and PIN is more reliable than reading magnetic stripe. Chip and PIN is quicker than typing in details from the card. Contactless card readers speed up transactions as no PIN is required.	**8**

Question	Answer	Marks
10	**Five** from: Dynamic parameter query is a query that prompts the user for input. The input is then used by the query as the value in an expression or criterion. Every time the query is run a dialogue box would appear asking her to type in the subject. Every time that Ayesha's static parameter query is run it will only ever search for the subject Biology. If she uses a dynamic parameter query and wants to look for another subject she will no longer need to open up the query in design view… …and change the subject criteria to the new subject. This would save the time of designing the query every time she wanted to find a subject.	**5**

Question	Answer	Marks
11	**Five** from: If the bridge was built and there were faults with it the cost of rebuilding/repairing it would be expensive. If mistakes were made in the construction phase, building the bridge could be very wasteful of materials. Easier to modify the model than changing the actual bridge. Costs less to modify the model than changing the actual bridge. It may be too dangerous to modify the actual bridge. You can test predictions more easily/model can make predictions more accurately. You can ask many "what if?" questions which would be impractical with the actual bridge.	**5**

Question	Answer	Marks
12	**Six** from: Custom written software is specially developed for a specific company/business. Custom written software is written to accommodate that customer's particular preferences and needs/off the shelf software has to be adapted to fit the business that has purchased it. Off-the-shelf software may have several unnecessary features that the company may not need/custom written software has only the features the user needs. Custom written software is written by programmers to solve specific problems. Custom written software is owned by the business that commissions it/off the shelf software means the business only has a licence. Off-the-shelf software is ready-written/ready for use and already exists/ there is often a delay between commissioning and receipt of custom written software. Off-the-shelf software is available to all businesses and companies/general public not just a specific company/business. Custom written software means that support is available directly from creators/off-the-shelf usually provide call centres which may not be able to solve problems specific to the business.	**6**

Question	Answer	Marks
13	**Five** from: Extranets allow companies to integrate operations with external stakeholders. Suppliers are able to communicate with the business. Customers can use it to place orders. Customers can access information such as support information. An extranet is a controlled private network that allows access to partners, suppliers or an authorised set of customers. Access is normally granted to a subset of the information accessible from an organisation's intranet. It provides access to needed services without granting access to an organisation's entire network. All of a company's ordering can take place via a secured private network. Any interaction with suppliers occurs in real time. A company's clients/customers can upload documents, ask questions whenever they have the time to do so.	**5**

Question	Answer	Marks
14	**Six** from: The reasoning consists of forward chaining or backward chaining or a mixture of both. Forward chaining starts with the available data and uses inference rules to extract more data... ... until a goal is reached. An inference engine using forward chaining searches the inference rules until it finds one where the If statement is known to be true. When such a rule is found, the inference engine uses the 'Then' part to cause the addition of new information. Inference engines will iterate through this process until a goal is reached Backward chaining starts with a list of goals/hypothesis and works backwards . An inference engine using backward chaining would search the inference rules until it finds one which has a Then part that matches a desired goal If the If part of that rule is not known to be true, then it is added to the list of goals. Because the list of goals determines which rules are selected and used, this method is called goal-driven, in contrast to data-driven forward-chaining.	**6**