



Cambridge International AS & A Level

INFORMATION TECHNOLOGY

9626/13

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 **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.

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)	The internet is a collection of web pages which can be accessed using a web browser	
	The internet is the global system of interconnected computer networks	✓
	The internet is only accessed using a switch	
	The internet is an internal restricted access network	
1(b)	Word processing is a service only accessed using the internet	
	Spreadsheet software is a service only accessed using the internet	
	The world wide web is a service only accessed using the internet	✓
	Email is a service only accessed using the internet	
1(c)	<p>Four from:</p> <p>Wide Area Network</p> <p>A wide area network is formed by connecting a number of LANs through a router or a modem. It covers a much larger geographical area than a LAN. Private WANs can be set up by organisations to connect their LANs by the means of leasing telephone lines... ...or private fibre optic cable purely for their own use... ...these can be Virtual Private Networks (VPNs). The use of an existing telecommunications network causes data transmission rates to be slower in a WAN than a LAN.</p>	4

Question	Answer	Marks
2(a)	It is only possible to export a video file using the file format it has been created in	
	Video files are often stored in jpeg format	
	It is possible to convert a video file into a gif format	✓
	It is not possible to insert a still image into a video file	

Question	Answer	Marks
2(b)	It is not possible to alter the speed of a video once it has been saved	
	Trimming a video clip is achieved by removing unwanted footage	✓
	It is not possible to add sound to a video once the video is finished	
	An aspect ratio is the number of frames in a section of a video compared to the total number of frames	
		1

Question	Answer	Marks
3	<p>Six from:</p> <p>To provide past, present and predictive information. It could be used in decision making. It could be used with project management. It could be used in database retrieval applications. Managers could use management information systems to gather and analyse information about various aspects of the organisation... ...such as personnel, sales, inventory, production or other applicable factors. Management information systems could be used to create reports on aspects such as sales, revenue and production. These reports could be provided at regular intervals to managers at all levels to help them evaluate their teams' performance. By comparing daily, weekly or monthly reports to previous reports, managers could spot trends, such as revenue growth or reduction.</p>	6

Question	Answer	Marks
4	<p>Eight from:</p> <p>Six max from: <i>Guest arriving:</i> The car's presence would be detected by an induction loop... ... because the electromagnetic field in the loop/coil is disturbed by a metallic object/car. The computer/microprocessor would receive a message from the induction loop to this effect. The computer/microprocessor would send a signal to a motor to operate. The motor would cause the barrier to raise. A light beam from one post passes across... ...to a light sensor in the other post. The computer/microprocessor receives a signal or not from the sensor. If the light sensor does not send a signal the bar remains vertical. If the light sensor sends a signal, the computer/microprocessor sends a signal to the motor to lower the barrier</p> <p>Six max from: <i>Guest departing:</i> The guest would receive a ticket with a bar code/Q code/receive the PIN from reception. On arriving at the exit barrier the guest would present the ticket to a scanner/keys in the PIN. The computer/microprocessor would compare the code/PIN with acceptable codes/PIN. If it matches, the computer/microprocessor would send a signal to a motor to operate. The motor would cause the barrier to raise. A light beam from one post passes across... ...to a light sensor in the other post . The computer/microprocessor receives a signal or not from the sensor. If the light sensor does not send a signal the bar remains vertical. If the light sensor sends a signal, the computer/microprocessor sends a signal to the motor to lower the barrier.</p>	8

Question	Answer	Marks
5(a)	<p>Four from:</p> <p>It may allow a larger set of data to be examined using less time and money than direct data collection would require.</p> <p>It allows data to be gathered from subjects to whom the data gatherer does not have physical access.</p> <p>A larger sample size can be used...</p> <p>...direct data gathering could have limitations due to the availability of the people being interviewed...</p> <p>...using indirect data sources the sample could be increased giving rise to greater confidence in the findings.</p> <p>There is a relatively low cost as travelling expenses and time taken to collect data using a direct data source can be great.</p> <p>Information can be of a higher quality as data collected indirectly has already been collated and grouped into meaningful categories.</p> <p>Poorly written responses to questionnaires or interview transcripts do not have to be read through to create the data source.</p>	4
5(b)	<p>Four from:</p> <p>The various purposes for which data was collected originally may be different to the purpose of the current research...</p> <p>...so unnecessary data may need to be filtered out.</p> <p>There may be no data available as the data required has simply never been recorded.</p> <p>There may be sampling bias as data from only one section of the community may have been collected (and data from a representative cross section of the community may be required).</p> <p>There may be coding difficulties...</p> <p>...as different sources being used means there will be differences in the content.</p> <p>...as there may be a lack of standardisation across the data required.</p> <p>...as different sources will have different amounts of data.</p> <p>If it has already been coded the coding may be difficult to understand.</p> <p>Indirect data sources may also vary in reliability, depending on who collected the data and how old the data are.</p>	4

Question	Answer	Marks
6	<p>Eight from:</p> <p>Needs to include all fields mentioned in question.</p> <p>Must be text boxes or individual character boxes.</p> <p>Film title space bigger than director and generally sensible spacing.</p> <p>Drop down dates for Date_bought or clear view of calendar.</p> <p>Radio buttons for DVD (Y/N).</p> <p>Navigation buttons.</p> <p>Help button/information on how to complete the form.</p> <p>Appropriate title.</p> <p>Appropriate white space and information fills the page.</p>	8

Question	Answer	Marks
7	<p>Six from:</p> <p>It could be translated using a compiler or interpreter</p> <p><i>Compiler – four max.</i> Would translate the whole program as one complete unit. Would create an executable file. Would report on the error in line 20 after compilation. Would not run the program until error is corrected and whole program retranslated.</p> <p><i>Interpreter – four max.</i> Would translate each line of the program into an intermediate stage and then execute that line/statement. Would report on the error in line 20 on execution. Would wait for error to be corrected before executing that line. Would then continue from line 20 to line 40.</p>	6

Question	Answer	Marks
8(a)	<p>Two from:</p> <p>The directors at the two sites do not have a connection between the LANs. A router will be needed to connect the LAN to the internet/WAN. Routers will be needed in Jakarta and Surabaya. The router in Jakarta will be used by Dian to connect to the LAN/router in Surabaya.</p>	2
8(b)	<p>Four from:</p> <p>A codec is a device/computer program used to encode or decode the digital data stream/signal. A codec is used to compress the data to reduce transmission bandwidth Codec is short for coder-decoder. A codec encodes a data stream/signal for transmission possibly in encrypted form. The decoder (function) reverses the encoding for playback.</p>	4

Question	Answer	Marks
9(a)	<p>Four from:</p> <p>The public key is used to encrypt the data. The corresponding private/secret key is used to decrypt the data. The public key is published to everyone. The private key is kept secret. Anyone with a copy of the public key can encrypt information. Only the private key holder can read the information. It is not possible to deduce the private key from the public key.</p>	4

Question	Answer	Marks
9(b)	<p>Two from:</p> <p>Symmetric encryption takes a shorter amount of time to encrypt data than asymmetric encryption. Symmetric encryption requires far less processing power to encrypt... ...and decrypt the content of a message. One mark for an appropriate example of a situation</p>	2

Question	Answer	Marks
10	<p>Eight from:</p> <p>Advantages: Models provide quick results for sales/income/expenditure/profits that may take months to actually happen. Graphs that are produced to show sales trends will automatically change as new values are added/old values altered. They provide consistent results; the same inputs will always produce the same answer (not affected by user's inconsistent decisions). Templates containing the formulas for regularly used spreadsheets reduce the need for technical experts. Spreadsheets can also interact with databases to provide data in the fields reducing the need for manual input.</p> <p>Disadvantages: You cannot account for every possible variable when forecasting sales/income/ expenditure/ profits... ... any variables need to be considered and it is easy to miss things out which may lead to misleading results. To try to account for as many variables as possible requires complex formulae which need experts who are expensive to hire. Producing an effective model may be time consuming. Complex sales predictions may need additional software which is expensive.</p> <p>Must have at least one of each to gain full marks</p>	8

Question	Answer	Marks
11	<p>Six from:</p> <p>Normalisation involves breaking down a flat file/table into less redundant, smaller tables.</p> <p>The stages in the breaking down process are referred to as normal forms such as 0NF, 1NF, 2NF and 3NF.</p> <p>To satisfy the requirements for 1NF all fields must contain atomic data... ...there must be no repeating groups of data... ...there must be a unique key.</p> <p>To convert to 2NF partial key dependencies must be removed.</p> <p>This can be achieved by dividing any table in 1NF that contains partial dependencies into separate tables.</p> <p>Those fields that are dependent on just one part of the compound key will form a new table... ...which will also contain that particular part of the compound key.</p>	6

Question	Answer	Marks
12	<p>Six from:</p> <p><i>Advantages of relational databases:</i></p> <p>A flat file database can contain many fields, often with duplicate data leading to wasting storage space/a relational database does not have duplicated data saving storage space.</p> <p>If the flat files contain some of the same fields, when data in one is changed the other has to be manually modified, wasting time.</p> <p>Adding records to a relational database is easier as less data has to be entered saving time.</p> <p>In a relational database certain tables can be made confidential so that when a person logs on with their username and password, the system can then limit access only to those tables whose records they are authorised to view... ...e.g. a receptionist would be able to view a worker's department and be able to locate him/her but would not be able to see their salary.</p> <p><i>Disadvantages of relational databases:</i></p> <p>Designing a relational database will take a lot of planning whereas the flat files already exist.</p> <p>Creating a relational database requires technical expertise which will have to be paid for.</p> <p>Some relational databases have limits on field lengths and this can lead to data loss.</p> <p>Must have at least one of each to gain full marks</p>	6

Question	Answer	Marks
13	<p>Six from:</p> <p><i>Advantages of the cloud</i></p> <p>The initial cost of an external hard disk drives can be more expensive than paying a low monthly fee for the cloud.</p> <p>Cloud storage has no physical presence/it does not take up valuable space at home or in the office.</p> <p>Cloud storage services back up data automatically after initially being instructed.</p> <p>Do not need to transport hard disk drive with you if you want to transfer data to another computer/device.</p> <p>Syncing ensures files are automatically updated across all devices owned by an individual.</p> <p><i>Disadvantages of the cloud</i></p> <p>Data will be in the hands of a third-party so security measures may be less than required.</p> <p>Cloud service providers can be transient, resulting in possible loss of data.</p> <p>Cloud storage is only as reliable as the user's internet connection.</p> <p>Some cloud service providers charge a cheap fee initially but then raise prices later.</p> <p>Users are at risk of not having their data stored in compliance with government regulations if the physical storage location resides in a different country.</p> <p>Must have at least one of each to gain full marks</p>	6

Question	Answer	Marks
14(a)	<p>Four from:</p> <p>Example of appropriate title.</p> <p>Appropriately labelled sectors including example.</p> <p>Percentages/Number attached to sectors including examples.</p> <p>Different colour sectors.</p> <p>Description of chart legend including example.</p>	4
14(b)	<p>Four from:</p> <p>They tend take up more space than the alternatives.</p> <p>They are harder to read than the alternatives.</p> <p>The brain's not very good at comparing the size of angles.</p> <p>Because there's no scale reading accurate values is difficult.</p> <p>They become more difficult to read as more segments and colours are added.</p> <p>Labels can be hard to fit especially to smaller segments.</p>	4