



CANDIDATE
NAME

CENTRE
NUMBER

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CANDIDATE
NUMBER

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0417/11

May/June 2020

2 hours

You must answer on the question paper.

No additional materials are needed.

- Answer **all** questions.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use an HB pencil for any diagrams, graphs or rough working.

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **16** pages. Blank pages are indicated.

1 A computer consists of both hardware and software.

(a) Define the term software.

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[2]

(b) There are two types of software.

Identify the types.

1.....

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2.....

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[2]

2 Tick (✓) whether the following statements refer to a Command Line Interface (CLI) or a Graphical User Interface (GUI).

	CLI (✓)	GUI (✓)
The user has to type in every instruction		
The user does not need to learn any of the instructions		
Each instruction has to be typed in correctly		
The user is in direct communication with the computer		

[2]

3 Every computer contains input and output devices and a central processing unit (CPU).

(a) Describe the CPU including its role.

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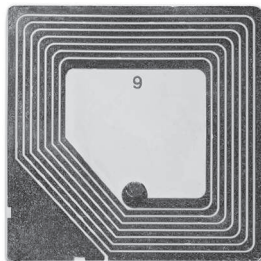
.....

.....

[4]

(b) Data can be read directly by using a number of different devices.

Name the most appropriate device used to read the following data.



.....

Cheque No.	Branch Code	Account No.	Transaction Code
05482	55448	654478	25447

.....



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[4]

- 4 A hospital is creating a database to store blood donors' medical details. The fields in the database include Health_number, Date_of_birth, Gender and Blood_group.

(a) When a new blood donor wishes to give blood they need to fill in a form.

Each blood donor has a unique health number which uses a 10-digit number, for example 9434765919.

Blood group can be A, B, AB or O.

Part of the form is shown below.

Blood donor	
1. What is your health number?	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
2. What is your date of birth?	<input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
3. What is your gender?	M/F
4. What is your blood group?	<input type="text"/>

Name a suitable data type for the answers given to each of the questions in the form. For any numeric field, specify the type of number.

Question 1.....

Question 2.....

Question 3.....

Question 4.....

[4]

(b) In the Blood_group field the only data that can be entered is A, B, AB or O.

Tick (✓) whether each of the following blood groups is an example of **abnormal** or **normal** data.

Blood group	abnormal (✓)	normal (✓)
AB		
C		
B		
AO		

[2]

(c) The administrator needs a list of all the blood donors in the database with blood group A as well as in the same list all the blood donors with blood group AB. This list will only include female blood donors.

To find the blood donor with the health number 9434765919 he will need to type in the following query.

Health_number = 9434765919

Write a query to find all the female blood group donors with the blood group A as well as those with AB.

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..... [6]

- (d) When the details of a new donor are added to the database the person's date of birth is entered.

Explain why the administrator would prefer their date of birth to be stored rather than their age.

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[4]

- (e) Name the most appropriate validation check for the Health_number.

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[1]

5 Phishing and pharming can affect the security of a user's data.

(a) Compare and contrast phishing and pharming.

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[6]

- (b)** Smishing is another security issue. Describe the methods which can be used to help prevent smishing.

[illegible]

[6]

- 6** Tick (✓) which of the following statements apply to LANs, which apply to WANs and which apply to WLANs.

	LAN (✓)	WAN (✓)	WLAN (✓)
The internet is an example of this type of network			
This type of network is found in a building but is connected without cables			
This type of network is used to transmit data between Europe and North America			
This type of network is found in a building but is connected with cables			

[4]

- 7 The headteacher of a school has decided to replace desktop computers with laptop computers.

Describe the advantages and disadvantages of using a laptop computer rather than a desktop computer.

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[4]

- 8 Following recent data protection issues the personal data we allow organisations to share about us may be reduced.

(a) Discuss the benefits and drawbacks of trying to keep personal data confidential and secure.

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[6]

- (b) The sharing of email addresses can lead to spam.

Explain what is meant by the term spam email.

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[2]

- (c) Explain why spam email should be prevented.

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[4]

9 Point of sale (POS) terminals are used in supermarkets.

(a) Tick (✓) which of the following devices used at a POS terminal are only input devices, which are only output devices and which are both.

Device	Input (✓)	Output (✓)	Both (✓)
Bar code reader			
Buzzer			
Touch screen on till			
Receipt printer			
Light sensor on the conveyor belt			
Electronic scales			

[6]

- (b) A stock file contains data about the goods being sold. Describe the steps needed to update the stock file when an item is scanned at the point of sale (POS) terminal. Include in your description how new stock can be ordered automatically.

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[6]

- 10** The network manager at a school has been asked to develop a student registration system to help staff keep a record of student attendance.

(a) Describe the steps required in the analysis of such a system.

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[6]

- (b)** The school is planning to use fingerprints as a way to record when students arrive in the class.

Describe the advantages and disadvantages of using fingerprint data entry for student registration systems rather than magnetic ID cards.

[illegible]

[4]

(c) Fingerprints are one example of biometrics.

Identify **three** other examples of biometrics.

1.....

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2.....

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3.....

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[3]

11 Most data protection acts include the principle that data should be accurate and, where necessary, kept up to date.

List **four** other principles of a typical data protection act.

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4.....

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[4]

- 12** The way we buy products using credit cards has changed in recent years. Originally the magnetic stripe on the back of the card was used with a signature. Then chip and PIN methods were used, and more recently contactless methods have been introduced.

Discuss the effectiveness of using these different methods to improve security when paying for goods.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

[8]

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Cambridge IGCSE™

INFORMATION AND COMMUNICATION TECHNOLOGY

0417/11

Paper 1 Written

May/June 2020

MARK SCHEME

Maximum Mark: 100

<p>Published</p>

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)	Two from: Software is programs and data Programs for controlling the operation of a computer Programs for processing of electronic data	2
1(b)	System software Applications software	2

Question	Answer			Marks
2		CLI	GUI	2
	The user has to type in every instruction	✓		
	The user does not need to learn any of the instructions		✓	
	Each instruction has to be typed in correctly	✓		
	The user is in direct communication with the computer	✓		
	Two marks for four correct ticks One mark for two or three correct ticks Zero marks for one correct tick			

Question	Answer	Marks
3(a)	Four from: An item of hardware It carries out the instructions of a computer program It performs basic arithmetic calculations It performs logical operations It performs input/output operations of the computer It contains the internal storage/control unit	4
3(b)	(i) RFID reader (ii) Magnetic Ink Character Reader/MICR (iii) Bar code reader (iv) Chip reader	4

Question	Answer	Marks
4(a)	Question 1 Numeric: integer // text Question 2 Date/time Question 3 Boolean/logical Question 4 Text/alphanumeric	4

Question	Answer	Marks															
4(b)	<table border="1"> <thead> <tr> <th></th><th>abnormal</th><th>normal</th></tr> </thead> <tbody> <tr> <td>AB</td><td></td><td>✓</td></tr> <tr> <td>C</td><td>✓</td><td></td></tr> <tr> <td>B</td><td></td><td>✓</td></tr> <tr> <td>AO</td><td>✓</td><td></td></tr> </tbody> </table> <p>Two marks for four correct ticks One mark for two or three correct ticks Zero marks for one correct tick</p>		abnormal	normal	AB		✓	C	✓		B		✓	AO	✓		2
	abnormal	normal															
AB		✓															
C	✓																
B		✓															
AO	✓																
4(c)	<p>Gender = F AND Blood_group = A*</p> <p>Gender – 1 mark = F – 1 mark AND – 1 mark = A* – 1 mark use of wildcard – 1 mark Blood_group – 1 mark</p>	6															
4(d)	<p>Two matched pairs from:</p> <p>The age changes every year therefore it will need to be changed regularly Administration of the database becomes more time consuming.</p> <p>The age of the donor can be easily and automatically calculated from their date of birth improving accuracy.</p> <p>Data only needs to be entered once reducing errors.</p>	4															
4(e)	Length check // Range check	1															

Question	Answer	Marks
5(a)	<p>Max four from:</p> <p><i>Comparisons</i> Both use the internet Both redirect the user to a fake website Both can lead to fraud and identity theft Both use websites that look legitimate Personal data is compromised</p> <p>Max four from:</p> <p><i>Differences</i> With phishing emails are sent to the computer In pharming malicious code is uploaded to the computer In phishing clicking a link sends user to a fake website In pharming the code redirects the user to a fake website without their knowledge The email in phishing appears to have come from a trusted source Website in pharming appears to be genuine In pharming spyware can be used to record key presses</p>	6
5(b)	<p>Six from:</p> <p>Avoid clicking on any unknown texts with links/Avoid clicking links in texts from people you do not know.</p> <p>Do not reply to text messages that have asked you about any of your personal finances/details.</p> <p>Report any suspicious activity.</p> <p>Be on the lookout for messages that contain the number 5000 or any number that is not a phone number as this is used by smishers. If the text messages urge you for a quick reply then that is a clear sign of smishing.</p> <p>Do extensive research before replying to any message. There are plenty websites that allow anyone to run searches based on a phone number and see any relatable information about whether or not a number is legitimate.</p> <p>Never call back a phone number that was associated with the text from an unknown source.</p> <p>If the message states 'Dear user, congratulations, you have won.' It is a clear sign for smishing.</p> <p>Check the time when the unknown message was sent.</p> <p>If the text message was sent at an unusual time, then that is another sign of smishing.</p>	6

Question	Answer				Marks
6		LAN	WAN	WLAN	4
	The internet is an example of this type of network		✓		
	This type of network is found in a building but is connected without cables			✓	
	This type of network is used to transmit data between Europe and North America		✓		
	This type of network is found in a building but is connected with cables	✓			
	One mark per correct row				

Question	Answer	Marks
7	<p>Max three from:</p> <p><i>Advantages</i></p> <p>All elements are together in one unit therefore takes up less space</p> <p>They are portable</p> <p>Can be used in more places than a desktop</p> <p>Max three from:</p> <p><i>Disadvantages</i></p> <p>Easier to steal/lose</p> <p>Limited battery life so more likely to run out of power</p> <p>Pointing devices can be more difficult to use</p> <p>In built webcams can be more difficult to use rather than a desktop</p> <p>If one piece of hardware breaks it can be more difficult to replace</p> <p>Desktops have a better heat dispersion rate</p> <p>More likely to be damaged as they are portable.</p> <p>Screen size may be smaller</p> <p>Less powerful</p>	4

Question	Answer	Marks
8(a)	<p>Max five from:</p> <p><i>Benefits</i> If personal data is kept confidential then identity theft is reduced It helps prevent fraud Reduces the chance of users suffering harm from criminals, as less data for criminals to attempt to access Protects sensitive data ... examples: racial/ethnic/political/religious/membership of trade unions/health/criminal activity Protects the data being used for purposes other than what it was collected for</p> <p>Max five from:</p> <p><i>Drawbacks</i> Difficult to enforce as users give information freely Most users do not read the terms and conditions before agreeing to them, therefore allowing data to be used Data protection is local but networks are global so laws are difficult to enforce Younger people do not mind that data is passed on therefore the law could not be enforced for all</p>	6
8(b)	<p>Two from:</p> <p>Electronic Junk email/unsolicited emails/sent to a person without requesting it Deliberate filling up of a user's inbox/many emails sent at once Emails sent to everyone on the mailing list</p>	2
8(c)	<p>Four from:</p> <p>Takes time to deal with it Can slow down networks Can fill up the receiver's mail box and therefore fill up hard disk/leads to denial of service Can increase the time needed to run your email software Could contain a virus</p>	4

Question	Answer				Marks																												
9(a)	<table><tr><th>Device</th><th>Input</th><th>Output</th><th>Both</th></tr><tr><td>Bar code reader</td><td>✓</td><td></td><td></td></tr><tr><td>Buzzer</td><td></td><td>✓</td><td></td></tr><tr><td>Touch screen on till</td><td></td><td></td><td>✓</td></tr><tr><td>Receipt printer</td><td></td><td>✓</td><td></td></tr><tr><td>Light sensor on the conveyor belt</td><td>✓</td><td></td><td></td></tr><tr><td>Electronic scales</td><td>✓</td><td></td><td></td></tr></table>				Device	Input	Output	Both	Bar code reader	✓			Buzzer		✓		Touch screen on till			✓	Receipt printer		✓		Light sensor on the conveyor belt	✓			Electronic scales	✓			6
	Device	Input	Output	Both																													
	Bar code reader	✓																															
	Buzzer		✓																														
	Touch screen on till			✓																													
	Receipt printer		✓																														
	Light sensor on the conveyor belt	✓																															
	Electronic scales	✓																															
One mark per correct row																																	
9(b)	<p>Max five from:</p> <p>Bar code is scanned at the POS/bar code number entered manually</p> <p>Bar code is searched for in the stock file ...</p> <p>... until the record is found</p> <p>Details of the product are read</p> <p>Stock level of the item reduced by 1</p> <p>New stock level written back to the file</p> <p>Item is flagged to state order in place</p> <p>If less than the re-order level then the item is automatically re-ordered – 1 mark</p>				6																												

Question	Answer	Marks
10(a)	<p>Six from: Current system is observed Staff/potential users interviewed Staff/potential users given questionnaires Gather information about current system Existing documents examined Inputs, outputs and processing of the current system determined Problems with current system identified User and information requirements identified System specification decided Hardware identified/justified Software identified/justified</p>	6

Question	Answer	Marks
10(b)	<p>Max three from:</p> <p><i>Advantages</i> Fingerprints are unique More accurate data entry Improved security Your fingerprints are with you all the time/cannot be lost/ID cards can be lost Student needs to be present at the reader Magnetic cards can be affected by magnetic fields/smart phones Very difficult to clone unlike cards</p> <p>Max three from:</p> <p><i>Disadvantages</i> Takes a longer time to collect all the fingerprints and store them rather than producing ID cards Equipment would be more expensive Damage to the finger/reader will give false readings/no reading Invasion of privacy</p>	4
10(c)	<p>Three from:</p> <p>Iris scan Hand print Facial recognition Voice recognition Retina scan</p>	3

Question	Answer	Marks
11	<p>Four from:</p> <p>Data should be fairly and lawfully processed Data should only be processed for the stated purpose Data should be adequate, relevant and not excessive/limited Data should not be kept longer than necessary Data should be processed in accordance with the data subject's rights Data should be kept secure Data should not be transferred to another country unless they have adequate protection. Data should be processed in a transparent manner Data should be collected for specified/explicit/legitimate purposes Data should only be further processed for archive purposes which is compatible with the initial purposes Data kept for archiving should safeguard the rights and freedoms of individuals Explicit consent required for processing sensitive data Parental consent required for processing personal data of children including online services Data subjects are allowed access to their personal data</p>	4

Question	Answer	Marks
12	<p>Magnetic stripe <i>Benefits</i> The user needs to have the card present to use it Data more difficult to copy as it uses a stripe Increased security as signature is also needed <i>Drawbacks</i> The card could be stolen and the signature copied Magnetic stripe can be affected by magnetic fields Card can be damaged due to overuse</p> <p>Chip and PIN <i>Benefits</i> Increased security as the card and a PIN is also needed The chip cannot be scanned remotely <i>Drawbacks</i> Shoulder surfing can take place Security risk as the chip contains personal information Card can be damaged due to overuse</p> <p>Contactless <i>Benefits</i> More secure as encryption is used to read the card Card details can be stored on a smartphone which might have an extra layer of security Stops shoulder surfing Only allows a small amount to be transacted <i>Drawbacks</i> Someone who steals the card can use it without a PIN Can be cloned using electronic devices No contact with the device so other devices may 'read' the card accidentally Security risk as the card contains personal information</p> <p>To achieve full marks all three methods must be discussed, the discussion must also cover both the benefits and drawbacks.</p> <p>One mark can be awarded for a reasoned conclusion</p>	8