Cambridge IGCSE™

CANDIDATE NAME	

CENTRE NUMBER							CANDIDATE NUMBER				

INFORMATION AND COMMUNICATION TECHNOLOGY   **0417/12**

Paper 1 Theory   **May/June 2021**

2 hours

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- 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.

INFORMATION

- 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. Any blank pages are indicated.

1 Tick (✓) whether the following are examples of **control**, **measurement** or **modelling** applications.

	control (✓)	measurement (✓)	modelling (✓)
Personal finance			
Weather forecasting			
Burglar alarms			
Weather stations			

[4]

2 (a) Circle **two** items that could be used to output data directly from a smartphone.

Blu-ray disc   microphone   mouse   screen

SD card   sensor   speaker   webcam

[2]

(b) One of the uses of a smartphone is the sending and receiving of emails.

Describe **four** other uses of a smartphone.

1...

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2...

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3...

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4...

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[4]

3 Tick (✓) the most appropriate storage medium that should be used in each scenario.

Scenario	Magnetic tape (✓)	RAM (✓)	ROM (✓)
To store the current instructions in use by a computer			
To back up data from a school network server			
To store data temporarily			
To store the start-up instructions of a computer			

[4]

4 Complete the sentences below using the most appropriate word from the list.

cookies   hacking   pharming   phishing

smishing   spam   spyware   virus

(a) The act of gaining unauthorised access to a computer system is called

.... [1]

(b) The software that gathers data by monitoring key presses on a user's keyboard is called

.... [1]

(c) A fake text message, that could contain a link, sent to a mobile phone is called

.... [1]

5 Petr has set up a database for a science project on planets in the solar system. Part of the database is shown.

ID	Name_of_planet	Number_of_moons	Orbital_period	Rings	Gravity	Type_of_planet	First_observed
4	Mars	2	1.88	N	0.38	Regular	1610
5	Ceres	0	4.61	N	0.27	Dwarf	1801
7	Saturn	62	29	Y	1.16	Gas Giant	1610
9	Neptune	14	165	Y	1.21	Gas Giant	1846
10	Pluto	5	248	N	0.62	Dwarf	1930
11	Haumea	1	309	N	0.401	Dwarf	2004

(a) When Petr was designing his database, he had to set the data types for each field. Complete the design table below by filling in the data types for each named field. Use the **most** appropriate data type. Each data type must be different. For any numeric field, specify the type of number.

Field name	Data type
Number_of_moons	
Orbital_period	
Rings	
Name_of_planet	

[4]

(b) Operators such as AND, OR, NOT, LIKE, >, >=, <, <=, =, <> can be used to search Petr's planet database. The search criteria for all the gas giant planets with more than 20 moons would look like this:

Type_of_planet = "Gas Giant" AND Number_of_moons > 20

Write down the search criteria that will produce a list of planets that are not gas giants but have at least one moon and were first observed after 1800.

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.... [7]

(c) Write down the names of the planets that are not gas giants but have at least one moon and were first observed after 1800.

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.... [2]

(d) Petr has copied the data from the Orbital_period field into a spreadsheet. The data for the orbital period for Mars, 1.88, is stored in cell A2. In cell B2 he has entered a function of:

ROUND(A2,0)

Explain in detail the function used in cell B2.

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.... [2]

6   Humans can send unmanned aircraft into storms to collect wind speeds and temperature data. The unmanned aircraft have sensors attached to them which send the data back to computers at the weather station. The computers analyse the data.

Previously the aircraft was manned and all the data was collected and flown back to the weather station.

Discuss the advantages and disadvantages of using the unmanned aircraft rather than using the manned aircraft.

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.... [8]

7   The owner of Tawara Hotels is planning a new computerised booking system. There are ten Tawara Hotels throughout the world. The current booking system allows people to book rooms in any of the Tawara Hotels. He has employed a systems analyst to research the current system and then install the new system.

(a) When analysing the current booking system, the systems analyst must identify the user requirements.

Explain why it is important for the systems analyst to do this.

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.... [3]

(b) Tick (✓) the relevant stage of the systems life cycle for each of the following activities.

Activity	Analysis (✓)	Development and testing (✓)	Evaluation (✓)
Identifying the problems with the current system			
Comparing the solution with the original task requirements			
Create the file structure			
Identify limitations to the new system and improvements to be made			

[4]

(c) Before the new booking system is installed, the systems analyst has to decide on a method of implementation. One method of implementation is pilot running.

Name **two** other methods of implementation and describe **two** benefits of each.

Name...

Benefit 1..

....

Benefit 2..

....

Name...

Benefit 1..

....

Benefit 2..

....

[6]

8 Students often use IT equipment; therefore it is important to have a good physical safety strategy.

Evaluate your own use of IT equipment, in terms of physical safety, and describe the strategies you will need to minimise the potential physical safety risks.

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.... [6]

9 (a) Describe **two** uses of a company intranet.

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[2]

(b) Social networking is used to communicate with friends; this is one use of the internet.

Describe **four** other uses of the internet.

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[4]

(c) A major part of the everyday use of the internet is social networking. Currently some social networks are not policed. The owners of a website have full discretion on what material is removed and what is allowed to be kept.

Discuss the benefits and drawbacks of policing social networking sites.

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.... [8]

10 Describe the advantages, to both the company and employees, of changing work patterns due to the introduction of computers.

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.... [6]

11 When an email is sent, it could have a digital certificate attached.

Explain why a digital certificate is required. Include in your answer items that could be found in a digital certificate.

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.... [5]

12 A search engine can be used to find information on the internet.

(a) Describe the disadvantages of using a search engine to find information rather than typing in a web address.

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.... [4]

(b) A student is writing a project on rare animals. He uses a search engine to find information about the animals from the internet. He is concerned about the reliability of some of the information he has found.

Explain how he would evaluate the reliability of this information.

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.... [6]

The student plans to create a table, using word processing software, to display the information he has found out about the animal.

The completed table will look like this:

Name of animal	Tiger quoll
Scientific name	Dasyurus maculatus
Pouched	No
Habitat	Australia
Conservation status	Threatened

(c) Explain how the student can create a table to enter this data.

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.... [2]

(d) The student has saved a picture from the internet of a tiger quoll.

Explain how he could create a new row above the Pouched row and place the picture into the right-hand cell of this new row.

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.... [4]

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Cambridge IGCSE™

INFORMATION AND COMMUNICATION TECHNOLOGY	**0417/12**
Paper 1 Written	**May/June 2021**
MARK SCHEME	
Maximum Mark: 100	

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.

Cambridge International is publishing the mark schemes for the May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and 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		control	measurement	modelling	4
	Personal finance			✓	
	Weather forecasting			✓	
	Burglar alarms	✓			
	Weather stations		✓		

Question	Answer	Marks
2(a)	Speaker Screen	2
2(b)	**Four** from, for example: Order goods from the internet Use it to surf/search the internet GPS Telephone/internet banking Make/receive phone calls Instant message Streaming of music Streaming videos Text messaging Taking photos	4

Question	Answer				Marks
3	Scenario	Magnetic tape	RAM	ROM	4
	To store the current instructions in use by a computer		✓		
	To back up data from a school network server	✓			
	To store data temporarily		✓		
	To store the start-up instructions of a computer			✓	

Question	Answer	Marks
4(a)	Hacking	**1**
4(b)	Spyware	**1**
4(c)	Smishing	**1**

Question	Answer	Marks
5(a)	<table><tr><td>Field name</td><td>Data type</td></tr><tr><td>Number_of_moons</td><td>**Numeric: Integer**</td></tr><tr><td>Orbital_period</td><td>**Numeric: Decimal**</td></tr><tr><td>Rings</td><td>**Boolean**</td></tr><tr><td>Name_of_planet</td><td>**Text**</td></tr></table>	**4**
5(b)	Type_of_planet<>"Gas Giant" AND Number_of_moons >=1 AND First_observed >1800 Only two ANDs correctly placed – 1 mark Type_of_planet – 1 mark <> "Gas Giant" – 1 mark Number_of _moons – 1 mark >=1 – 1 mark First_observed – 1 mark >1800 – 1 mark	**7**
5(c)	Pluto Haumea	**2**
5(d)	It would take the value of A2 – 1 mark Changes the value into an integer/zero decimal places – 1 mark	**2**

Question	Answer	Marks
6	**Eight** from: *Advantages* Less expensive to fly the aircraft into the storm Less risk to life as there is no flight crew It can be flown closer to the storm Time taken to receive the data is shorter as don't have to land the aircraft before sending data Results are processed immediately On board computers can analyse the data continuously Readings can be taken more frequently *Disadvantages* The sensors could malfunction and there is no way of repairing them easily You can lose the signal due to the electrical charges in the storm Less responsive Slower to react May go out of range **To gain full marks there needs to be advantages and disadvantages**	8

Question	Answer	Marks
7(a)	**Three** from: The systems analyst is creating a system that is just for the client Important to meet the needs of the user; so it is customised Reduces the costs if the new system matches the existing hardware and software More efficient system is produced that does what the users require	3
7(b)	<table><tr><td>Activity</td><td>Analysis</td><td>Development and testing</td><td>Evaluation</td></tr><tr><td>Identifying the problems with the current system</td><td>✔</td><td></td><td></td></tr><tr><td>Comparing the solution with the original task requirements</td><td></td><td></td><td>✔</td></tr><tr><td>Create the file structure</td><td></td><td>✔</td><td></td></tr><tr><td>Identify limitations to the new system and improvements to be made</td><td></td><td></td><td>✔</td></tr></table>	4

Question	Answer	Marks
7(c)	Direct changeover – 1 mark **Two** from: Benefits are immediate Costs less as fewer staff are needed Costs less as only one system is required Less likelihood of malfunction as system is fully tested Parallel running – 1 mark **Two** from: If new system fails, old system can be used as a back up Possible to gradually train staff Phased changeover – 1 mark **Two** from: If the new system fails, only one part is affected Easier to ensure that part of the system is fully operational before moving onto the next part Possible to train staff in one part of the system, therefore less costly than parallel Possible to gradually train staff	6

Question	Answer	Marks
8	Matched pairs from, for example: I always check whether wires are damaged/lose when I plug in my computer equipment ...This will reduce electrocution I always check whether sockets are safe/not broken when I plug in equipment... ...This will reduce electrocution I only plug in one plug per socket ...This reduces the chance of fire I make sure all wires are fastened to the wall/placed under carpets/in ducts//Use wireless... ...This reduces tripping hazards Check and install circuit breakers... ...This reduces electrocution/fire hazard Make sure no drinks or food is brought near to computers... ...This reduces electrocution I make sure computer vents are not covered... ...This reduces the chances of fire I make sure all IT equipment is safely in the middle of desks//I make sure strong tables are used to store IT equipment/I don't store IT equipment on high shelves... ...To stop them falling on me and causing an injury	6

Question	Answer	Marks
9(a)	**Two** from: Send/receiving emails Send/receive attachments/files Internal file transfer within the company Allows the creation of extranets Surf internal information/webpages Sharing/use of applications/resources	2
9(b)	**Four** from, with descriptions: Email Use of the web Newsgroups Online chat Streaming Internet telephone Online conferencing Gaming File transfer	4

Question	Answer	Marks
9(c)	*Benefits* Max **four**: Can reduce cyber bullying/hate speech/sexual harassment Can reduce social media from being used for illegal activities Can reduce the ability to incite violence/trolling Could prevent people from being subjected to inappropriate messages Can reduce illegal/inappropriate images *Drawbacks* Freedom of speech is reduced Would be very difficult to police as there is a massive amount of information Different rules in different countries and social media crosses borders Very costly to create an effective deterrent Could force individuals to use other un-policed methods of communication Who decides what is acceptable and what is not acceptable Privacy issues as people checking could read messages Difficult to police as users can be anonymous **To gain full marks there needs to be benefits and drawbacks**	8

Question	Answer	Marks
10	**Six** from: *Advantages to employees* Staff are more flexible when they work so they can carry out other activities Staff are more contented as they can work hours which suit their home life They can start later/earlier so they avoid rush hour in the morning, so they do not arrive stressed They can start earlier/work later to avoid rush hour in evening so cuts travel time Compressed hours can lead to longer holidays/weekends therefore staff more refreshed Part time working allows people with other commitments to work Job sharing allows a piece of work to be completed using the skills set of more than one worker therefore cutting stress Working from home allows employees to balance their home life *Advantages to the company* Working from home allows the company to employ people from around the world Working from home allows the company to save costs by not needing large offices Helps employers retain their employees… …therefore cutting training/recruitment costs Flexi-time allows company offices to remain open longer Job sharing reduces training costs **To gain full marks there needs to be advantages to both the employees and the company**	6

Question	Answer	Marks
11	Max **four** from: Adds a level of security Verifies the email comes from a known and trusted source Provides the receiver with a means of reply/private key Used for initialising secure SSL connections between web browsers and web servers Max **three** from: Details of the owner of the digital certificate Serial number Public key Digital signature Subject name Valid from Valid to//Expiry date	**5**

Question	Answer	Marks
12(a)	**Four** from: Information overload Web sites at the top of the list may not be relevant May be more irrelevant information Search engines may not include all web pages If a website loads faster, it is given priority Search engine company may be paid to display certain web pages	**4**
12(b)	**Six** from: Check the author of the website as anybody can publish their understanding of a topic Check if the website has excessive advertising Check the content/advertising of its own products of a website to see if it biased Check the final part of the domain name of the URL Example .ac, .gov, .org Check if site is endorsed by reliable/reputable people/organisations Check if it has links to other reliable sites Check if it has testimonials/reviews Check if the author's credentials are good Check if information is comparable to other information from reliable authenticated experts Check if the date of the last update was a long time ago Check if website has excessive spelling and grammar mistakes Can compare information from other sites to see if it is reliable	**6**
12(c)	**Two** from: Select the position for the table Click on Insert then table Select/type in 2 columns and 5 rows Type in the data	**2**

Question	Answer	Marks
12(d)	Max **three** from: Highlight Scientific name row Right click select insert Click Insert new row below Or Highlight Pouched row Right click select insert Click Insert new row above Max **three** from Click on right hand cell in the row Click insert…pictures Locate/select picture Insert the picture Format the picture	**4**