



CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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## 0417/12

February/March 2022

**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 A tablet computer consists of both hardware and software.

(a) Define the term hardware.

.....  
.....

[1]

(b) One input device used on a tablet computer is a touch screen.

Name **two** other input devices built into a tablet computer.

1 .....  
2 .....

[2]

(c) Write down **two** examples of system software.

1 .....  
2 .....

[2]

2 Circle **two** items that contain personal data.

bank card	bar code	laser printer
medical record	mouse	sensor

[2]

3 The internal memory of a computer consists of both ROM and RAM.

(a) Describe the terms ROM and RAM.

ROM .....

.....

.....

.....

RAM .....

.....

.....

.....

[4]

(b) Modern laptop computers use Solid State Drives (SSD) rather than Hard Disk Drives (HDD).

State **three** advantages of using SSDs rather than HDDs in a laptop computer.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

- 4 Tick (✓) whether the following statements refer to control, measurement or modelling systems.

Only tick (✓) **one** answer for each statement.

	control (✓)	measurement (✓)	modelling (✓)
Maintaining the growing conditions in a glasshouse			
Aircraft flight simulation			
Monitoring the pollution in a river			
Using what-ifs			

[4]

- 5 The World Wide Web (WWW) is often mistaken for the internet.

(a) Explain the differences between the WWW and the internet.

.....

.....

.....

.....

.....

.....

.....

.....

[4]

(b) The web address for Cambridge IGCSE is:

<https://www.cambridgeinternational.org/IGCSE>

Describe the following parts of the web address.

[https://](https://www.cambridgeinternational.org/IGCSE) .....

.....

cambridgeinternational .....

.....

.org .....

.....

/IGCSE .....

.....

[4]

6 Global Positioning Systems (GPS) are used for many different applications.

(a) Describe how GPS is used by a smartphone to pinpoint its location.

.....

.....

.....

.....

.....

.....

.....

.....

[4]

(b) Give **three** other examples of the use of GPS.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

- 7 Tawara School is presenting a concert. For previous concerts the booking of tickets was carried out manually using pen and paper.

For this concert they are going to use an online booking system.

- (a)** Discuss the advantages and disadvantages of Tawara School using an online booking system rather than the manual system.

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

[8]

- (b)** Identify the most appropriate method of implementation of the new online booking system in this scenario.

---

[1]

- (c) Explain, giving reasons, why your answer to **part (b)** is the most appropriate method of implementation for this scenario.

.....

.....

.....

.....

.....

.....

[3]

- 8 Describe the advantages and disadvantages of using a smartphone rather than a laptop computer to access the internet.

.....

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[6]



9 The introduction of computers into the work place has affected job patterns.

(a) Explain what is meant by part-time working.

.....  
.....  
.....  
.....

[2]

(b) Explain what is meant by compressed hours working.

.....  
.....  
.....  
.....

[2]

(c) Employees working in an office use computers for prolonged periods of time.

Describe **three** items that an employee should be provided with to help reduce the health problems related to prolonged use of computers.

1 .....  
.....  
2 .....  
.....  
3 .....  
.....

[3]

(d) The office must be a safe working environment.

State **two** physical safety issues that might exist from the introduction of computers.

1 .....

.....

2 .....

.....

[2]

**10** A touch screen is both an input device and an output device. Touch screens are used on many devices. A tablet computer uses a touch screen.

Describe the advantages and disadvantages of using a touch screen rather than a monitor and keyboard for the tablet computer.

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.....

[6]

- 11** When creating an ICT solution, the legal, moral, ethical and cultural implications have to be considered.

Choose the most appropriate implication that matches the descriptions given below.

- (a)** Ensuring that copyright laws have been followed.

..... [1]

- (b)** Not giving information about the ICT solution to another company.

..... [1]

- 12** The manager of a car garage has asked a systems analyst to create a new database system for the checking of cars making sure they are safe to drive. The checking of cars is known as a service.

Each car has a unique licence plate.

The cars can either be powered by electric or petrol.

Cars are serviced every 10000 km, for example 10000 km, 20000 km.

The minimum cost of the service is 1500 rupees and the maximum is 5000 rupees depending on the model of car.

Different models of car are serviced.

The date of the service is agreed.

- (a)** Complete this table, filling in the field names and the most appropriate data types to create the database using the information given above. For any numeric field, specify the type of number.

Field name	Data type
Vehicle_licence_plate	
Powered_by	
	Numeric:integer
Cost_of_service	
	Text
Date_of_service	

[6]

(b) The systems analyst is planning to create a relational database.

Discuss the advantages and disadvantages of creating a relational database rather than a flat file database.

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.....

.....

.....

.....

[6]

- (c) For each of the fields shown, name and describe **one** validation check that could be used on the data. Your answers must be different in each case.

(i) Vehicle\_licence\_plate

Validation check .....

Description .....

.....

[2]

(ii) Cost\_of\_service

Validation check .....

Description .....

.....

[2]

(iii) Date\_of\_service

Validation check .....

Description .....

.....

[2]

**13** A family has a number of different devices connected to the internet.

- (a) Identify **three** items of computer hardware that may need to be purchased in order to set up a computer network so the devices can use the internet.

1 .....

2 .....

3 .....

[3]

- (b) Arjun is a member of the family. He uses the internet to carry out research and send work to his office.

Describe **three** other ways he could make appropriate use of the internet.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

- (c) Arjun uses the internet to carry out research for his work.

Describe **two** drawbacks of Arjun using the internet for research.

.....

.....

.....

.....

[2]

(d) Arjun can log directly into his office system from his home computer. The office system only requires users to enter their user id and a password.

(i) Explain why this is **not** very secure.

.....  
.....  
.....  
.....

[2]

(ii) Describe **two** other ways the office system could identify the user securely.

1 .....

.....  
.....  
.....  
.....

2 .....

.....  
.....  
.....  
.....

[4]

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# Cambridge IGCSE™

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INFORMATION AND COMMUNICATION TECHNOLOGY

0417/12

Paper 1 Theory

February/March 2022

MARK SCHEME

Maximum Mark: 100

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**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 February/March 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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)	Physical components of a computer system	1
1(b)	<b>Two</b> from: Microphone Camera Sensors	2
1(c)	<b>Two</b> from: Compiler Linker Operating system Utilities Device driver Interpreter	2

Question	Answer	Marks
2	Bank card Medical record	2

Question	Answer	Marks
3(a)	<p><b>Four</b> from:</p> <p><b>ROM</b> Read Only Memory Non-volatile//Data is not lost when the computer is switched off Used to store the startup instructions/BIOS</p> <p><b>RAM</b> Random Access Memory Volatile//Data is lost when the computer is turned off Stores the current running program/instruction RAM can be written to and read from</p> <p><b>To gain full marks the description must have correct answers for both ROM and RAM</b></p>	4
3(b)	<p><b>Three</b> from:</p> <p>The startup of the laptop is faster SSDs consume less power than HDD so conserves battery power Reduces the weight of the laptop as SSD is lighter Makes the laptop more compact</p>	3

Question	Answer				Marks
4		Control	Measurement	Modelling	4
	Maintaining the growing conditions in a glasshouse	✓			
	Aircraft flight simulation			✓	
	Monitoring the pollution in a river		✓		
	Using What-ifs			✓	

Question	Answer	Marks
5(a)	<p><b>Four</b> from:</p> <p>WWW is a collection of information pages/websites/web pages</p> <p>WWW is part of the internet</p> <p>WWW is accessed through the internet</p> <p>WWW is a service on the internet</p> <p>Internet is a global network of networks/Wide Area Network</p> <p>Internet is the infrastructure</p> <p><b>To gain full marks the description must have correct answers for both WWW and the internet</b></p>	4
5(b)	<p><b>https://</b></p> <p><b>One</b> from:</p> <p>This is the hypertext transfer protocol secure</p> <p>Set of rules/protocol to transfer web pages securely</p> <p><b>cambridgeinternational</b></p> <p>The domain name</p> <p><b>.org</b></p> <p><b>One</b> from:</p> <p>The top-level domain name</p> <p>Registered as an organisation</p> <p><b>/IGCSE</b></p> <p>The folder/sub-directory in which the work is stored on Cambridge International's server</p>	4

Question	Answer	Marks
6(a)	<b>Four</b> from: The location of the smartphone is calculated using GPS software Signal is transmitted by the satellite Signal is sent almost continuously The data is saved in the smartphone The coordinates of the smartphone are shown on the smartphone screen	<b>4</b>
6(b)	<b>Three</b> from, for example: Real time aircraft/ship/drone position Tracking delivery/stolen vehicles Ploughing fields Surveying Military Sat-nav in vehicle to reach a destination	<b>3</b>

Question	Answer	Marks
7(a)	<b>Eight</b> from: <b>Advantages</b> Prevents double booking/overbooking The booking staff can see immediately if the concert is fully booked Bookings can be made 24×7 Usually cheaper as lower/fewer overheads Booking staff can more easily see the seats that are available  <b>Disadvantages</b> Requires the school to purchase expensive hardware Setting up is more expensive Maintenance is more expensive Internet access is needed to run the booking system therefore the cost may be increased More reliant on hardware  <b>To gain full marks the discussion must have correct answers for both advantages and disadvantages</b>	<b>8</b>
7(b)	Direct changeover	<b>1</b>
7(c)	<b>Three</b> from: Benefits are immediate Cheaper as there is only one set of staff Less chance of the new system being faulty as it is thoroughly tested Only one system in operation therefore data is not duplicated	<b>3</b>

Question	Answer	Marks
8	<p><b>Six</b> from:</p> <p><b>Advantages</b></p> <p>Smartphone can access the internet in more places</p> <p>Smartphone is more likely to retain the connection whilst on the move</p> <p>They can access the internet quickly as they are more likely to have the smartphone with them</p> <p><b>Disadvantages</b></p> <p>Websites displayed on the smartphone are not full versions of the website</p> <p>Browsing/reading the website is more difficult due to smaller screen size</p> <p>More difficult to type in/navigate the websites/emails due to smaller onscreen keyboard</p> <p>As children can access the internet from anywhere it leaves them more vulnerable to exploitation</p> <p><b>To gain full marks the description must have correct answers for both advantages and disadvantages</b></p>	6

Question	Answer	Marks
9(a)	<p><b>Part-time</b></p> <p>Working fewer hours a week... ...than full time staff</p>	2
9(b)	<p><b>Compressed</b></p> <p>Works the required hours in a week... ...in a fewer number of days</p>	2
9(c)	<p><b>Three</b> from, for example:</p> <p>Wrist rest</p> <p>Ergonomic keyboards</p> <p>Ergonomic chairs</p> <p>Footrests</p> <p>Ergonomic mouse</p> <p>LCD/TFT/LED/anti-glare screens</p> <p>Voice activated software</p> <p>Adjustable monitors</p>	3
9(d)	<p><b>Two</b> from:</p> <p>Tripping over trailing cables</p> <p>Fire caused by overheating computers</p> <p>Fire caused by overloaded sockets</p> <p>Electrocution caused by spilling drinks on the computer</p> <p>Electrocution caused by touching live wires</p> <p>Injuries caused by equipment falling</p>	2

Question	Answer	Marks
10	<p><b>Six from:</b></p> <p><b>Advantages</b></p> <p>The footprint of the computer will be smaller</p> <p>Fewer peripherals needed therefore saves money</p> <p>Makes the computer lighter</p> <p>Easier to select icons</p> <p><b>Disadvantages</b></p> <p>If the screen is damaged, then the device cannot be used to input data</p> <p>Keyboards and monitors can be replaced more easily</p> <p>Large fingers could mis-key data therefore more errors on data entry</p> <p>Screens can become dirty more easily therefore affects reading of data</p> <p><b>To gain full marks the description must have correct answers for both advantages and disadvantages</b></p>	6

Question	Answer	Marks
11(a)	Legal	1
11(b)	Ethical	1

Question	Answer		Marks
12(a)	<b>Field name</b>	<b>Data type</b>	6
	Vehicle_licence_plate	Text/alphanumeric	
	Powered_by	Boolean	
	Service_interval	Numeric:Integer	
	Cost_of_service	Numeric: Currency	
	Model	Text	
	Date_of_service	Date	

Question	Answer	Marks
12(b)	<p><b>Six from:</b></p> <p><b>Advantages</b></p> <p>Service details only need to be entered once into the database</p> <p>Mistakes are less likely to happen when entering data if it already exists</p> <p>Uses data redundancy</p> <p>Data can be accessed using key fields</p> <p>Uses data flexibility</p> <p>Uses data integrity</p> <p>Uses data consistency</p> <p>Better security due to user level access control</p> <p>Caters for future requirements</p> <p><b>Disadvantages</b></p> <p>Relational databases can be more complex</p> <p>Requires training to set up</p> <p>Harder to set up</p> <p>Requires a data administrator therefore increasing the costs</p> <p><b>To gain full marks the discussion must have correct answers for both advantages and disadvantages</b></p>	<b>6</b>
12(c)(i)	<p>Presence check</p> <p>To make sure that it has been entered as its unique</p> <p>Format check</p> <p>To fit in with the layout</p>	<b>2</b>
12(c)(ii)	<p>Type check</p> <p>Digits only</p> <p>Range check</p> <p>Between 1500 and 5000</p>	<b>2</b>
12(c)(iii)	<p>Format check</p> <p>To ensure it is dd/mmm/yyyy</p> <p>Range check</p> <p>To ensure it is between certain dates</p> <p>Length check</p> <p>Maximum of for example 11 characters (could be 8 or 6)</p>	<b>2</b>



Question	Answer	Marks
13(a)	Network cards Router Switch/hub	<b>3</b>
13(b)	<b>Three</b> from: Email Online chat//Instant message VOIP Online conference Streaming music/video/TV on demand Gaming Use of the Cloud Newsgroups FTP	<b>3</b>
13(c)	<b>Two</b> from: Information can be unreliable Unregulated so anyone can post anything More difficult to find what you are looking for Vast amount of information//Information overload Information can be biased/inaccurate Its slower to find relevant information Data may be out of date	<b>2</b>
13(d)(i)	<b>Two</b> from: User id and password can sometimes be easily guessed Passwords can be hacked with key logging software Passwords can be hacked by using random password generators Others can see the details being typed in If the home computer saves the log in information, then anyone can access If the user does not logout, then others can access data	<b>2</b>

Question	Answer	Marks
13(d)(ii)	<p><b>Way 1:</b> One-use code/token Arjun logs in then software generates a one-use code/token Arjun enters the code/token into the system</p> <p>Even if hacker intercepts code/token is no use as can only be used once Token is time limited</p> <p><b>Way 2:</b> Card/dongle The user has a dongle/card which is inserted into the computer The dongle/card is read by the computer</p> <p>The dongle/card data is unique</p> <p><b>Way 3:</b> Biometrics Using biometric scanner to capture digital image of fingerprint/retina/iris/face</p> <p>Each biometric is unique Biometrics are nearly impossible to forge</p> <p><b>To gain full marks the answers must correctly describe two ways</b></p>	<b>4</b>