

# HARDWARE

## Question 1

- 2 Kal teaches Computer Science and uses different devices when teaching his students.

(a) Tick (✓) **one or more** boxes on each row to indicate whether each device is an input device, an output device, or both.

Device	Input	Output
LCD monitor		
Microphone		
Keyboard		
Touchscreen		

[2]

(b) Kal has built a 3D printer to show students how it works.

(i) The steps 1 to 9 describe the basic internal operation of a 3D printer.

The following five statements are used to complete the sequence of steps.

<b>A</b>	A stepper motor moves the nozzle into position
<b>B</b>	A fan cools the layer
<b>C</b>	The software splits the object into slices
<b>D</b>	The nozzle extrudes the molten plastic
<b>E</b>	The data about the slices is sent to the printer

Write one of the letters **A, B, C, D** or **E** in the appropriate step to complete the sequence.

- The object is designed using Computer Aided Design (CAD) software
- .....
- .....
- The solid plastic is melted and transferred to the nozzle
- .....
- .....
- The steps 5 to 6 are repeated until the layer is complete
- .....
- The steps 4 to 8 are repeated for each subsequent layer

[4]

- (ii) The 3D printer has both RAM and ROM.

Describe the purpose of RAM and ROM in a 3D printer.

RAM .....

.....

.....

ROM .....

.....

.....

.....

[4]

## Question 2

- 1 Samira is creating an interactive, multimedia presentation for the entrance to her hotel.

- (a) The presentation will be on a device that has a resistive touchscreen for user input.

Complete the following paragraph about the basic operation of a resistive touchscreen.

The resistive touchscreen has two layers with ..... between the layers. When a finger touches the screen, the ..... moves to touch the ..... ; this creates a point of contact.

The ..... and ..... position of this point is calculated.

[4]

Question 3

2 Billy has a laser printer.

(a) Complete the following description of the basic internal operation of a laser printer.

The printer uses a ..... and a rotating .....  
to draw the contents of the page on the photosensitive drum as .....  
charge. The ..... is attracted to this charge.

[4]

(b) The laser printer has both RAM and ROM.

Describe the purpose of RAM and ROM in the **laser printer**.

RAM .....  
.....  
.....  
.....

ROM .....  
.....  
.....  
.....

[4]

## Question 4

- 4 Shazia is creating a computer program that will be released to the public. The program includes a video.

(a) Shazia uses a microphone to record a sound track for the video.

(i) Describe the internal operation of a microphone.

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.....

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.....

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..... [3]

(ii) The script for the sound track is printed using a laser printer.

Describe the internal operation of a laser printer.

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..... [3]

(c) Shazia's computer has Dynamic RAM (DRAM) and Static RAM (SRAM).

Explain the differences between Dynamic RAM and Static RAM.

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..... [4]

## Question 5

2 Aaron uses a desktop computer to do school work.

(a) Aaron has a mouse and keyboard that he can use as input devices and a monitor as an output device.

(i) Identify **two** additional input devices Aaron could use with his desktop computer.

1 .....

2 ..... [2]

(ii) Identify **two** additional output devices Aaron could use with his desktop computer.

1 .....

2 ..... [2]

(iii) Aaron needs to store a large number of applications and data on his computer. He needs at least 50GB of secondary storage space.

Identify **one** internal secondary storage device for Aaron's computer.

..... [1]

(iv) Describe the internal operation of a trackerball mouse.

..... [3]

## Question 6

- 6 Dominic uses a tablet computer to complete work. He records videos of his work to send to his colleagues to watch at a later date.

(a) The tablet computer has input and output devices.

(i) The table lists four devices built into the tablet.

Tick (✓) one or more boxes for each device to identify whether it is an input device, an output device or both.

Device	Input	Output
Touchscreen		
Webcam		
Microphone		
Fingerprint scanner		

[2]

(ii) An external speaker is plugged into the tablet computer.

The sequence of steps 1 to 7 describes the internal operation of the speaker.

The statements **A**, **B**, **C**, **D** and **E** are used to complete the sequence.

Letter	Statement
<b>A</b>	Changes in the audio signal cause the direction of the electrical current to change. This determines the polarity of the electromagnet.
<b>B</b>	The vibration creates sound waves.
<b>C</b>	An electric current is sent to the speaker.
<b>D</b>	The electromagnet is repelled by, or attracted to the permanent magnet.
<b>E</b>	The electric current passes through the coil.

Write **one** of the letters **A** to **E** in each appropriate row to complete the sequence.

- 1 .....
- 2 .....
- 3 The current in the coil creates an electromagnetic field.
- 4 .....
- 5 .....
- 6 The movement of the coil causes the diaphragm to vibrate.
- 7 .....

[4]

**(b)** The tablet computer's secondary storage is solid state (flash) memory.

**(i)** Give **one** reason why the tablet computer needs secondary storage.

.....  
..... [1]

**(ii)** Describe solid state memory.

.....  
.....  
.....  
.....  
.....  
..... [3]

**(c)** The tablet computer has RAM and ROM memory.

State the purpose of RAM and ROM memory in the computer.

RAM .....  
.....  
ROM .....  
..... [2]

# Question 7

- 1 In a supermarket, a self-checkout machine allows customers to scan the barcodes of products and then pay for their shopping. These are an alternative to the traditional cashier-staffed checkout.



(a) The self-checkout machine has a touchscreen.

(i) Identify **two** other input devices that self-checkout machines have.

1 .....

2 ..... [2]

(ii) Identify **two** other output devices that self-checkout machines have.

1 .....

2 ..... [2]



- (iii) The touchscreen uses capacitive technology.

The sequence of steps 1 to 6 describes the internal operation of the touchscreen.

The statements **A**, **B**, **C** and **D** are used to complete the sequence.

<b>A</b>	Charge is drawn to the point of contact.
<b>B</b>	The screen has a layer that stores an electrical charge.
<b>C</b>	There is a change in the electrostatic field.
<b>D</b>	The coordinates are sent to the touchscreen driver.

Write **one** of the letters **A** to **D** in each appropriate row to complete the sequence.

- 1 .....
- 2 When the user touches the screen
- 3 .....
- 4 .....
- 5 The coordinates of the point of contact can be calculated.
- 6 .....

[2]

- (b) The self-checkout machines have primary storage.

- (i) Give **two** reasons why the self-checkout machine needs primary storage.

- 1 .....
- 2 .....

[2]

- (ii) The self-checkout machines use Static RAM (SRAM) for their cache.

The following table has statements about SRAM or Dynamic RAM (DRAM).

Tick (✓) **one** box in each row to identify whether the statement is about SRAM or DRAM.

Statement	SRAM	DRAM
More expensive to make		
Requires refreshing (recharging)		
Made from flip-flops		

[2]

## Question 8

7 A student plays computer games on a games console.

(a) Identify **two** input devices and **one** output device used in a games console.

Input device 1 .....

Input device 2 .....

Output device .....

[3]

(b) The games console has random access memory (RAM) and read only memory (ROM).

(i) State **two** differences between RAM and ROM.

Difference 1 .....

.....

Difference 2 .....

.....

[2]

(ii) Give **one** use for RAM in the games console.

.....

.....[1]

(iii) Give **one** use for ROM in the games console.

.....

.....[1]

### Question 9

- 7 A zoo has a computer system for the visitors to access multimedia content about the zoo and its animals.

- (a) The users interact with the computer system through touchscreens.

**Describe the internal operation of a touchscreen.**

[illegible]

- (b) (i) Give one output device, other than a touchscreen, that may be part of this computer system.

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- (ii) Give two input devices, other than a touchscreen, that may be part of this computer system. State how each device will be used by the visitors.

Device 1 .....

**Use** \_\_\_\_\_

Journal Pre-proof

Device 2 .....

**Use** \_\_\_\_\_

(c) Give the most appropriate secondary storage device for this computer system.

Describe two reasons for your choice.

Device .....

Reason 1 .....

.....

.....

.....

Reason 2 .....

.....

.....

.....

[5]

(d) This computer system has Random Access Memory (RAM) and Read Only Memory (ROM).

State what will be stored in RAM and ROM for this computer system.

RAM .....

.....

ROM .....

.....

[2]

## Question 10

1 A student is creating a short video and needs to record music to play in the background.

(a) The student uses a microphone to capture the music.

Explain how the microphone captures the music.

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.....

.....

.....[3]

## Question 11

(c) There are two types of RAM: dynamic RAM (DRAM) and static RAM (SRAM).

The following table shows **five** statements about DRAM and SRAM.

Tick (✓) **one** box in each row to indicate whether the statement applies to DRAM or SRAM.

Statement	DRAM	SRAM
Does not need to be refreshed as the circuit holds the data while the power supply is on		
Mainly used in cache memory of processors where speed is important		
Has less complex circuitry		
Requires higher power consumption under low levels of access, which is significant when used in battery-powered devices		
Requires data to be refreshed occasionally so it retains the data		

[5]

Question 12

- 2 (a) (i) The following sequence of steps (1 to 7) describe how a single page is printed on a laser printer.

The statements A, B, C and D are used to complete the sequence.

<b>A</b>	The paper passes through a fuser, which heats up the paper. The toner melts and forms a permanent image on the paper.
<b>B</b>	The electrical charge is removed from the drum and the excess toner is collected.
<b>C</b>	The image is converted on the drum into an electrostatic charge.
<b>D</b>	The oppositely-charged paper picks up the toner particles from the drum. After picking up the toner, the paper is discharged to stop it clinging to the drum.

Complete the sequence by writing one of the letters **A**, **B**, **C** or **D** on the appropriate row.

1. A laser beam and a rotating mirror are used to draw an image of the page on the photosensitive drum.
2. ....
3. Electrostatic charge attracts toner.
4. The charged paper is rolled against the drum.
5. ....
6. ....
7. ....

[3]

- (ii) A computer user has a laser printer to print letters and documents. The user also prints digital photographs taken using a digital camera.

State the most suitable type of printer for printing the photographs.

.....[1]

- (b) The user is considering the purchase of a new laptop computer. She has read many product reviews and knows that there are different types of internal secondary storage available.

List **two** options for internal secondary storage.

Option 1 .....

Option 2 .....

Describe **one** advantage of one of the options.

Advantage of choosing option 1 / 2 (circle)

.....

.....[3]

### Question 13

- 2 (a) The first column of the following table gives features of different types of printer.

Put a tick (✓) in the cells to show which features describe a laser and an inkjet printer.

	Type of printer	
	Laser	Inkjet
Impact printer		
Non-impact printer		
Line printer		
Page printer		

[2]

- (b)** Two of the components of an inkjet printer are a stepper motor and a print head.

Describe how each component is used when printing a page.

(i) Print head

(ii) Stepper motor

[illegible]

- (c) A student has an old working laptop computer. It has a small capacity internal disk drive with almost all the storage space taken up by the operating system and application programs.

She needs to buy an external storage device to store her data files.

- (i) List **two** suitable devices.

Device 1 .....

Device 2 ..... [2]

- (ii) Describe **one** advantage of choosing one of the devices.

Advantage of choosing device 1 / 2 (*circle*)

.....

..... [1]



# Question 14

5 A Personal Computer (PC) has a number of input and output devices.

(a) (i) Name **three** components of a speaker.

1 .....

2 .....

3 ..... [3]

(ii) Explain the basic internal operation of a speaker.

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.....

.....

.....

.....

..... [4]

(b) (i) The user is considering the purchase of a removable device for secondary storage.

Name **one** suitable device.

..... [1]

(ii) Describe **two** possible uses for this device on a home Personal Computer (PC).

1 .....

.....

2 .....

.....

[2]

### Question 15

- 6 (a) A personal computer (PC) is extensively used for a wide range of applications, including the three shown in the following table.

Write in the table, a suitable input device, output device, or both needed for each application.

Do not give a monitor, keyboard or mouse in your answers.

Application	Input device	Output device
Capture the text from a paper document, in order that the text can be word processed		
Producing a replica of a small plastic component from a washing machine		
A museum has interactive information facilities throughout the building		



- (b) Explain the basic internal operation of a hard disk drive.

[illegible]

## Question 16

5 A Personal Computer (PC) has a number of input and output devices.

(a) (i) Name **three** components of a speaker.

1 .....

2 .....

3 ..... [3]

(ii) Explain the basic internal operation of a speaker.

.....

.....

.....

.....

.....

.....

..... [4]

(b) (i) The user is considering the purchase of a removable device for secondary storage.

Name **one** suitable device.

..... [1]

(ii) Describe **two** possible uses for this device on a home Personal Computer (PC).

1 .....

.....

2 .....

.....

[2]

Question 17

- 2 (a) State **two** differences between Static RAM (SRAM) and Dynamic RAM (DRAM).

1 .....

.....

2 .....

.....[2]

Question 18

- 4 Describe the basic internal operation of the following devices:

(i) Keyboard

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.....[2]

(ii) Optical disc

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.....[2]

(iii) Optical mouse

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.....[2]

(iv) Scanner

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.....[2]

Question 19

3 When an application program requests a file stored on a hard disk, the computer system reads the file. Use the statement labels A to H to complete the sequence of steps that describe how this happens.

Label	Statement
A	When the hard disk drive has read the file, it generates an interrupt.
B	While the file continues, the head reads successive clusters of sectors from the disk and writes data into the disk buffer.
C	The head reads the first cluster of sectors from disk and writes data into the disk buffer.
D	The head moves to the correct track.
E	The operating system transfers the contents of the disk buffer to the application program's data memory.
F	In the relevant directory file, the operating system looks up the track and sector where the file begins.
G	Application program passes file read request to the operating system.
H	The hard disk drive waits for the correct sector to arrive under the head.

- 1. The application program executes a statement to read a file.
- 2. ....
- 3. The operating system begins to spin the hard disk, if it is not currently spinning.
- 4. ....
- 5. ....
- 6. ....
- 7. ....
- 8. ....
- 9. ....
- 10. ....

[8]

## Question 20

6 (a) Describe **two** differences between RAM and ROM.

1 .....

.....

2 .....

..... [2]

(b) State **three** differences between Dynamic RAM (DRAM) and Static RAM (SRAM).

1 .....

.....

2 .....

.....

3 .....

..... [3]

## Question 21

6 (a) Name the **most** suitable input or output device for each of the following uses.

Give a different device in **each** case.

Description of use	Input or output device
input of credit card number into an online form	
selection of an option at an airport information kiosk	
output of a single high-quality photograph	
output of several hundred high-quality leaflets	
input of a hard copy image into a computer	

## Question 22

- 4 (a) There are two types of RAM: dynamic RAM (DRAM) and static RAM (SRAM).

Five statements about DRAM and SRAM are shown below.

Draw a line to link each statement to the appropriate type of RAM.

Statement	Type of RAM
requires data to be refreshed periodically in order to retain the data	
has more complex circuitry	DRAM
does not need to be refreshed as the circuit holds the data as long as the power supply is on	
requires higher power consumption which is significant when used in battery-powered devices	SRAM
used predominantly in cache memory of processors where speed is important	

[5]

(b) Describe three differences between RAM and ROM.

.....

.....

.....

.....

.....

.....

.....[3]

(c) DVD-RAM and flash memory are two examples of storage devices.

Describe **two** differences in how they operate.

.....

.....

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.....[2]



Question 23

- 1 (a) Give **three** differences between Dynamic RAM (DRAM) and Static RAM (SRAM).

.....

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.....

.....

.....

.....[3]

- (b) (i) Examples of primary and secondary storage devices include:

- hard disk
- DVD-RW
- flash memory

For each device, describe the type of media used.

Hard disk .....

.....

DVD-RW .....

.....

Flash memory .....

.....[3]

- (ii) Describe the internal operation of the following devices:

DVD-RW .....

.....

DVD-RAM .....

.....[2]

Question 24

2 (a) Describe how a laser mouse operates.

.....

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.....

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.....[3]

(b) The following table shows a list of five statements which describe the stages when a page is printed using an inkjet printer.

Put each statement in the correct sequence by writing the numbers 1 to 5 in the right-hand column.

Statement	Sequence number
Paper feed stepper motor activated; sheet of paper fed from paper tray	
Printer driver translates data into a suitable format for the printer	
The print head moves across the page; ink is sprayed each time the print head pauses for a fraction of a second	
Paper feed stepper motor advances paper a fraction of a cm after each complete head pass	
Printer receives data from the computer and stores the data in the printer's buffer	

[5]

Question 25

1 Four types of storage, labelled **A**, **B**, **C**, **D** are shown in the table below.

(a) Four types of memory, media or devices are shown in the first column.

Consider each medium or device and put a tick (✓) in the appropriate column **A**, **B**, **C** or **D** to indicate the type of storage to which it belongs.

You should only put one tick (✓) in each column.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
	<b>primary memory storage</b>	<b>magnetic secondary storage</b>	<b>optical secondary storage</b>	<b>solid state secondary storage</b>
<b>DVD-RAM</b>				
<b>ROM</b>				
<b>hard disk</b>				
<b>flash memory</b>				

[4]

(b) For the following applications, state which of the four types of storage **A**, **B**, **C** or **D** is the most appropriate.

Use each type of storage once only. Indicate your answer by circling **A**, **B**, **C** or **D**.

(i) to store the BIOS

**A                  B                  C                  D** [1]

(ii) to store the operating system and applications software

**A                  B                  C                  D** [1]

(iii) to allow simultaneous recording and playback by a video recorder with removable media

**A                  B                  C                  D** [1]

(c) State **one** benefit and **one** drawback of using flash memory.

benefit .....

.....

drawback .....

..... [2]

## Question 26

- 5 A company issues a plastic card security pass to each of its workers. The pass consists of a photograph and a 10-digit security number stored on a magnetic stripe.
- (a) When a worker arrives at the workplace, he inserts his card into a device at the gate and the magnetic stripe is read. The photograph is also scanned. He then looks up at a digital camera which also records his face pattern. The system is controlled by a computer.
- (i) Explain how the system confirms that the worker is allowed access.

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[3]

## Question 27

- 2 (a) State **three** different types of secondary storage media. Explain how digital data is stored on each.

Type 1

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Type 2

.....

.....

.....

.....

Type 3

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.....

.....

[6]

(b) A remote-controlled toy car contains both RAM and ROM. The car can be programmed to carry out a number of manoeuvres.

(i) Describe the main differences between RAM and ROM.

.....

.....

.....

.....

..... [2]

(ii) How are the two types of memory used in the car?

.....

.....

.....

.....

..... [2]

## Question 28

(ii) State a program stored in ROM, giving a reason why it must be stored in ROM.

Program .....

Reason .....

.....

..... [2]

(iii) State the purpose of this program.

.....

..... [1]