

2 A student has an image file stored on their computer.

(a) The image file was taken by a digital camera.

Tick (✓) **one** box to show whether a digital camera is an example of an input, output, process or storage device.

- A** input ☐
- B** output ☐
- C** process ☐
- D** storage ☐

[1]

(b) The size of the image file is 3072 bytes.

(i) Give the size of the image file in kibibytes (KiB).

..... [1]

(ii) State the number of nibbles in 1 byte.

..... [1]

Working space

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(c) The image file has a colour depth of 32 bits.

(i) State what is meant by a colour depth of 32 bits.

.....

..... [1]

(ii) The colour depth of the image file is changed to 64 bits.

Explain what effect this change has on the image file.

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(d) The student uses lossless compression to compress the image file.

Explain how the image file is compressed using lossless compression.

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..... [3]

2 A student has a smartphone.

(a) Identify **two** input devices that can be built into the smartphone.

1
2 [2]

(b) Identify **two** output devices that can be built into the smartphone.

1
2 [2]

(c) The smartphone contains secondary storage.

(i) Explain the purpose of the secondary storage in the smartphone.

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..... [2]

(ii) Identify the most suitable type of secondary storage for the smartphone.

Explain your choice.

Secondary storage type

Explanation

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..... [4]

4 A student has a smartwatch.

(a) The smartwatch has built-in input and output devices.

Identify **two** input devices that can be built into the smartwatch.

1
2 [2]

(b) Identify **one** output device that can be built into the smartwatch.

..... [1]

(c) The smartwatch has read only memory (ROM).

Explain why the smartwatch needs ROM.

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..... [2]

(d) The smartwatch uses a text message application that receives data from cloud storage.

(i) Describe what is meant by cloud storage.

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..... [2]

(ii) Explain **two** benefits of the application using cloud storage.

1
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- (e) The smartwatch only displays the time and text messages.

A student incorrectly describes this smartwatch as a general-purpose computer.

Explain why the student's description is incorrect.

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..... [2]

- 8 A robot vacuum cleaner uses sensors to navigate around obstacles in a room.

- (a) Tick (✓) **one** box to show which sensor would be the most suitable for this purpose.

- | | | |
|----------|-----------|--------------------------|
| A | proximity | ☐ |
| B | flow | ☐ |
| C | pressure | ☐ |
| D | level | ☐ |

[1]

- (b) An expert system can be used to diagnose an error with a robot vacuum cleaner.

Circle **three** components that are part of an expert system.

- | | | |
|----------------|------------------|------------------|
| knowledge base | operating system | firewall |
| server | printer | actuator |
| | rule base | inference engine |
| | encryption | |

[3]

- (c) Explain how the robot vacuum cleaner can make use of machine learning.

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..... [3]

- 1 A student has a portable tablet computer.

- (a) Identify **two** input devices that could be built into the portable tablet computer.

1

2 [2]

- (b) Identify **one** output device that could be built into the portable tablet computer.

..... [1]

- (c) Identify **one** type of storage device that could be built into the portable tablet computer.

..... [1]

- 6 A sensor is an input device that is used to capture data from its surrounding environment.

- (a) Circle **three** other input devices.

- | | | |
|----------------------------------|-----------------------|------------|
| touch screen | hard disk drive (HDD) | headphones |
| speaker | microphone | actuator |
| universal serial bus (USB) drive | printer | keyboard |

[3]

- (b) Sensors can be used in an automated system.

Give **two** benefits of using sensors in this type of system.

1

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2

..... [2]

(c) The table contains different types of sensors and a use for each.

Complete the table by giving a suitable use for each type of sensor. The first one has been done for you.

type of sensor	use
acoustic	to monitor whether a water pipe has cracked and is leaking and dripping onto the floor
temperature	
humidity	
infra-red	
magnetic field	

[4]

- 5 A farm has an automated drinking system for its animals. The drinking system has a water bowl that contains the water. When the water bowl is empty, it is automatically refilled.

The system uses a sensor and a microprocessor.

- (a)** Identify the most appropriate sensor for this system.

..... [1]

- (b) Describe how the sensor and the microprocessor are used to automatically refill the water bowl.

[6]

[6]