

Past-paper walk-through

Input and output devices ■ 3.2

eXercise

Questions in this set

- 0478/12 J25 Q2 ■ 9 marks
- 0478/11 N24 Q2 ■ 10 marks
- 0478/12 N24 Q4 ■ 13 marks
- 0478/12 N24 Q8 ■ 7 marks
- 0478/11 J24 Q1 ■ 4 marks
- 0478/13 J24 Q6 ■ 9 marks
- 0478/11 J23 Q5 ■ 7 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 2

0478/12 J25 ■ Q2 ■ 9 marks

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. **[1]**

A input

B output

C process

D storage

Question 2

0478/12 J25 ■ Q2 ■ 9 marks

A student has an image file stored on their computer.

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

[1]

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

[1]

Question 2

0478/12 J25 ■ Q2 ■ 9 marks

A student has an image file stored on their computer.

(c)(i) State what is meant by a colour depth of 32 bits. [1]

(c)(ii) The colour depth of the image file is changed to 64 bits.
Explain what effect this change has on the image file. [2]

Question 2

0478/12 J25 ■ Q2 ■ 9 marks

A student has an image file stored on their computer.

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

Explain how the image file is compressed using lossless compression.

[3]

Solution 2

A input



B output

C process

D storage

Answer: **A**

Question 2

0478/11 N24 ■ Q2 ■ 10 marks

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

[2]

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

Explain your choice.

[4]

Solution 2

(a) Mark scheme

- Any two from:
- For example:
 - ■ Touchscreen
 - ■ Microphone
 - ■ Sensor // by example
 - ■ Biometric device
 - ■ Button
 - ■ (Digital) camera

Solution 2

(b)

Mark scheme

- Any two from:
- For example:
 - ■ Screen
 - ■ Speaker
 - ■ LED
 - ■ Actuator

Solution 2

(c)(i) Mark scheme

- Any two from:
 - ■ To store data/files permanently
 - ■ ... otherwise, data/programs would need to be downloaded/entered/installed every time the smartphone was turned on
 - ■ To allow software to be downloaded/installed on the smartphone //
 - ■ To store user files
 - ■ For the creating of virtual memory

Solution 2

(c)(ii) Mark scheme

- One mark for:
- Solid state
- Any Three from:
 - ■ It is small/thin in size
 - ■ ... so it would fit easily into the smartphone device
 - ■ It is lightweight
 - ■ ... so it wouldn't make the smartphone heavy to carry
 - ■ It has no moving parts

Solution 2

- ■ ... so it would be durable/robust
- ■ ... if the smartphone is dropped the data is less likely to be damaged/lost
- ■ It has fast read/write speeds
- ■ ... so it would be quick to load files/software
- ■ It runs at a cool temperature
- ■ ... so it wouldn't make the smartphone hot to hold for the user
- ■ It doesn't make a lot of noise
- ■ ... so it wouldn't ruin the user's experience of listening to music/watching videos
- ■ It doesn't require much power
- ■ ... so it won't drain the battery

Solution 2

- ■ It can have a large storage capacity
- ■ ... so can store files that are multimedia

Question 4

0478/12 N24 ■ Q4 ■ 13 marks

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]

Question 4

0478/12 N24 ■ Q4 ■ 13 marks

A student has a smartwatch.

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

[1]

Question 4

0478/12 N24 ■ Q4 ■ 13 marks

A student has a smartwatch.

(c) The smartwatch has read only memory (ROM).
Explain why the smartwatch needs ROM.

[2]

Question 4

0478/12 N24 ■ Q4 ■ 13 marks

A student has a smartwatch.

(d)(i) Describe what is meant by cloud storage. [2]

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

1.

2. [4]

Question 4

0478/12 N24 ■ Q4 ■ 13 marks

A student has a smartwatch.

(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.

[2]

Solution 4

(a)

Mark scheme

- Any two from:
 - ■ Touchscreen
 - ■ Microphone
 - ■ Button
 - ■ (Digital) camera
 - ■ Sensor // by example

Solution 4

(b)

Mark scheme

- Any one from:
 - Screen
 - Speaker
 - LED
 - Actuator

Solution 4

(c) Mark scheme

- Any two from:
 - ■ To store the BIOS
 - ■ To store the bootstrap
 - ■ To help start-up the smart watch // to store start-up instructions
 - ■ To store the firmware
 - ■ For non-volatile storage // to store data permanently
 - ■ To store data/instructions that should not change (unless needed)

Solution 4

(d)(i)

Mark scheme

- Any two from:
 - A collection of servers
 - Allows access to data remotely // Stores data in a remote location
 - Hardware can be owned/managed by a third party
 - Data storage that is stored/accessed using the internet

Solution 4

(d)(ii) Mark scheme

- Any four from:
- ■ No need to maintain the hardware
- ■ ... the third party is responsible for maintaining the hardware / security of the data
- ■ Resources can be increased / decreased (on demand) // Can have unlimited storage capacity
- ■ ... no need to worry about running out of storage space
- ■ ... can save cost of purchase of hardware

Solution 4

- ■ Need less/no (secondary) storage space on the watch
- ■ ... watch can remain/is small in size
- ■ ... costs of watch can be kept lower
- ■ Can access the data from other/any devices
- ■ ... if the watch breaks/is lost data is still available

Solution 4

(e) Mark scheme

- Any two from:
 - ▪ The watch can only perform a dedicated/limited functions/tasks
 - ▪ ... and a general purpose computer performs many/multiple functions
 - ▪ ... (this means that) it is an embedded system
 - ▪ You cannot plug in peripherals
 - ▪ You cannot reprogram the smartwatch // Cannot install other software/apps
 - ▪ It would only have a microprocessor // It would not have a CPU

Question 8

0478/12 N24 ■ Q8 ■ 7 marks

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. [1]

A proximity

B flow

C pressure

D level

Question 8

0478/12 N24 ■ Q8 ■ 7 marks

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

(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
- inference engine

Question 8

- rule base
- encryption

[3]

Question 8

0478/12 N24 ■ Q8 ■ 7 marks

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

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

[3]

Solution 8

A proximity



B flow

C pressure

D level

Answer: **A**

Question 1

0478/11 J24 ■ Q1 ■ 4 marks

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]

Solution 1

(a) Mark scheme

- Any two from:
- Example:
- ■
- Touch screen
- ■
- Microphone
- ■
- Button

Solution 1

- ■
- Webcam // (digital) camera
- ■
- Accelerometer
- ■
- Biometric device

Solution 1

(b) Mark scheme

- Any one from:
- Example:
 - ■
- Screen
 - ■
- Speaker
 - ■
- LED

Solution 1

(c)

Mark scheme

- SSD // Solid-state drive // Solid-state (device)

Question 6

0478/13 J24 ■ Q6 ■ 9 marks

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

Question 6

- printer
- keyboard

[3]

- A** touch screen
- B** hard disk drive (HDD)
- C** headphones
- D** speaker
- E** microphone
- F** actuator
- G** universal serial bus (USB) drive

Question 6

H printer

I keyboard

Question 6

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

Question 6

infra-red	
magnetic field	

[4]

Question 6

0478/13 J24 ■ Q6 ■ 9 marks

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

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

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

1. 2.

[2]

Question 6

0478/13 J24 ■ Q6 ■ 9 marks

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

(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	

Question 6

[4]

Solution 6

(a)

Mark scheme

- touch screen microphone keyboard

Solution 6

(b) Mark scheme

- Any two from:
- Example:
 - ■
- Data can be collected without human intervention
- ■
- Gathers data faster than a human
- ■
- It will be accurate at taking readings

Solution 6

- ■
- It can take readings continuously (24/7)
- ■
- It can take readings in dangerous environments

Solution 6

(c) Mark scheme

- One mark for each use (Max 1) per sensor:
- Example:
- Temperature
- ■
- Checking whether the water in a kettle is boiling
- ■
- Monitoring the temperature in a room that is climate controlled
- Humidity

Solution 6

- ■
- Checking whether the air is dry enough in a spray-painting garage
- ■
- Checking whether the air is moist enough in a greenhouse
- Infra-red
- ■
- Detecting motion in a room for a security system
- ■
- Detecting whether a person is approaching automatic doors
- Magnetic field

Solution 6

- ■
- Counting vehicles that cross a bridge
- ■
- Monitoring vehicles that enter a car park

Question 5

0478/11 J23 ■ Q5 ■ 7 marks

- 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.

Question 5

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

Solution 5

(a) Mark scheme

- Any one from:

-

- Level

-

- Pressure

-

- Moisture

- 1

Solution 5

(b) Mark scheme

■ Any Six from:

■ ■

■ Sensor continually sends digitised data to microprocessor

■ ■

■ Microprocessor compares data to stored value(s)

■ ■

■ If value is outside range / matches microprocessor sends signal to release water to refill water bowl

Solution 5

- ■
- ... bowl filled by set amount // bowl filled for certain time
- ■
- Actuator used to release water
- ■
- Whole process repeats until turned off/stopped
- 6