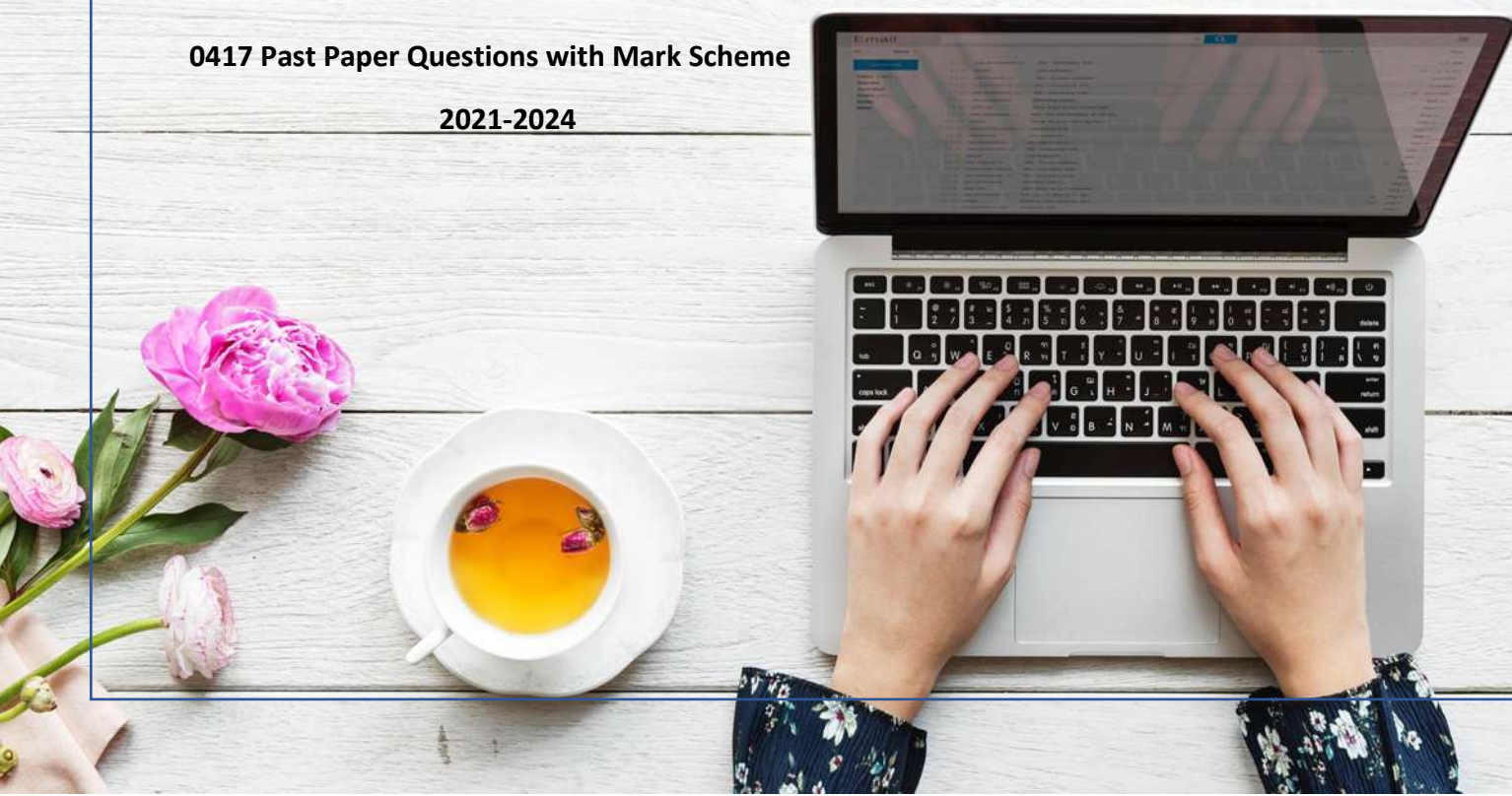# Information and Communication Technology
-0417-

Chapter Two: Input and Output Devices

0417 Past Paper Questions with Mark Scheme

2021-2024

1   Complete the following sentences, using the most appropriate direct data entry device.

a bar code reader   a chip reader   MICR   a magnetic stripe reader

OCR   OMR   PIN pad   RFID reader

(a) The device that reads data from a card in a contactless card system is called

.... [1]

(b) The device that reads scanned text and converts it into a readable form is called

.... [1]

(c) The device that reads the data made up of black lines and spaces on household goods is called

.... [1]

2   Circle **two** input devices that could be used in a smartphone.

HDD   magnetic stripe reader   microphone   mouse

remote control   speaker   touchpad   touch screen

[2]

3   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]

4   Tick (✓) the most appropriate printer which relates to the following statements.

	3D (✓)	Dot matrix (✓)	Laser (✓)
This printer is an impact printer			
This printer uses toner			
This printer uses an inked ribbon			
This printer uses tomography			

[4]

5   (a) Describe **two** disadvantages of using a tablet computer rather than a laptop computer.

1 ....

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2 ....

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[2]

(b) Modern computers often do not have an optical drive.

State **two** ways music can be transferred onto a computer that does not contain an optical drive.

1 ....

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2 ....

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[2]

6   An air-conditioning system has been fitted in a hotel bedroom. The air-conditioning system will contain fans which operate at varying speeds.

Identify the devices used in the system from the descriptions given.

(a) This device captures the temperature from the room.

.... [1]

(b) This device changes the data from the microprocessor into a form that can change the speed of the fan.

.... [1]

(c) This output device operates the fan.

.... [1]

7   A tablet computer has input and output devices.

(a) Give **two** examples of input devices which are part of a tablet computer.

1 ....

2 ....
[2]

(b) Give **two** examples of output devices which are part of a tablet computer.

1 ....

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2 ....

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[2]

8   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]

9   Many bank cards now use contactless technology.

Describe the advantages and disadvantages of using these cards rather than cards that use chip and PIN.

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.... [4]

10 A river authority is concerned about levels of pollution in a major river. The quality of the water in the river needs to be monitored using sensors.

(a) Name **three** sensors that could be used to measure the pollution in the river.

1 ....

2 ....

3 ....

[3]

(b) Discuss the advantages and disadvantages of using computers to measure the pollution in the river rather than humans measuring the pollution.

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.... [6]

11 Circle **two** input devices.

3D printer	Actuator	CD ROM	Digital camera
Keyboard	Linker	Monitor	Speaker

[2]

12 A computer-controlled glasshouse is used to grow plants.

Identify **two** output devices used in this glasshouse.

1 ....

2 ....

[2]

13 A library is considering the way it issues books. The librarians are planning to use RFID rather than bar codes.

Describe the advantages of using RFID rather than bar codes.

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.... [4]

14 Identify **two** input devices which are used in computer control systems.

1 ....

2 ....

[2]

15   When a ticket is produced for a new system it contains a QR code.

Here is an example of a QR code.

Describe the benefits of using a QR code.

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.... [5]

16   A student is carrying out a scientific experiment to measure the temperature of a liquid as it cools down. The student uses a sensor connected to a computer to read the temperature.

(a) Give **three** advantages of using computers and sensors rather than the student taking the temperature readings herself.

1 ....

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2 ....

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3 ....

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[3]

(b) Describe how the readings taken by the sensor are displayed on a graph using the computer.

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.... [6]

(c) Explain the differences between measurement systems and control systems.

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.... **[4]**

17   A research student is undertaking a study of endangered animals in the Amazon rainforest. She is using a drone to replace surveys carried out on foot. A drone is a remote-controlled flying vehicle.

Describe the benefits and drawbacks of using a drone to monitor the animals in the rainforest.

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.... **[6]**

18   In 2019 Cambridge recorded the highest temperature for July in the UK. The data was collected automatically using sensors by a weather station and sent to a computer.

Discuss the advantages and disadvantages of using sensors to collect data rather than humans collecting the data.

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.... [8]

19 An autonomous vehicle uses an automated braking system. There is a sensor at the front of the vehicle to measure the distance between the vehicle and the obstacle. The brakes are applied when the vehicle gets too close to the obstacle.

Describe the use of a microprocessor in the automated braking system.

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.... [4]

20 Cars can have sensors at the front and rear of the vehicle to detect obstacles.

Describe how the sensor detects an obstacle and sends the data to the microprocessor when parking the car.

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[4]

21 When a person changes their password they are asked to verify that it has been entered correctly by re-entering the password.

Ch.15 (a) State what this type of verification is called.

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[1]

(b) The keyboard used to enter the password is an input device.

Explain the differences between input and output devices.

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[4]

(c) State the direct data entry device that is used to read the following types of data.

(i)

....

[1]

(ii)

977135120128602

....

[1]

(iii)

....
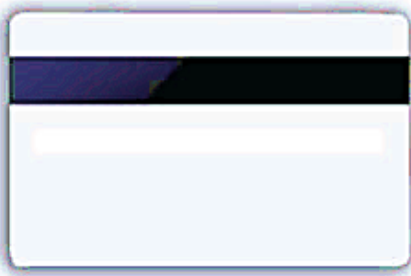
[1]

(iv)

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[1]

22 An automatic vacuum cleaner uses sensors to detect obstacles. If the vacuum cleaner is too close to the obstacle, it stops and automatically changes direction.

Describe the drawbacks of using this type of control system.

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.... [4]

23

(a) Describe the advantages and disadvantages of entering the data by scanning the bar code rather than typing in the number.

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.... [4]

(b) A bar code reader is an example of a direct data entry device.

State **three** other examples of direct data entry devices.

1 ....

2 ....

3 ....

[3]

24 State **two** direct data entry devices.

1 ....

2 ....

[2]

25 A company produces medicines. Chemists working in the company use 3D printers.

(a) The 3D printer is an example of an output device.

State **three** other output devices.

1 ....

2 ....

3 ....

[3]

(b) The chemists use the 3D printers to produce customised tablets.

Describe how a 3D printer produces a customised tablet.

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.... [3]

26 A desktop computer uses both input and output devices.

(a) Compare input and output devices. Your answer should include both similarities and differences.

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.... [4]

(b) State **three** input devices that can be used with a desktop computer.

1 ....

2 ....

3 ....

[3]

(c) State **three** output devices that can be used with a desktop computer.

1 ....

2 ....

3 ....

[3]

Mark Scheme

Question	Answer	Marks
1a	RFID reader	1
1b	OCR	1
1c	a bar code reader	1

Question	Answer	Marks
2	Microphone Touch screen	2

Question	Answer	Marks
3	**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
4		3D	Dot matrix	Laser	4
	This printer is an impact printer		✓		
	This printer uses toner			✓	
	This printer uses an inked ribbon		✓		
	This printer uses tomography	✓			

Question	Answer	Marks
5a	**Two** from: Can be more expensive to run if the internet is accessed by mobile data networks Touch screen can be more error prone when typing the data Laptop computers support more file formats Does not have a physical keyboard therefore more difficult to type Has a smaller screen therefore can be more difficult to read	2
5b	**Two** from: Streaming music from the internet Sent by Bluetooth from another device Plugging in an optical device/flash drive/HDD/SSD Downloading music from the cloud Direct input using a microphone Sent by email attachment	2

Question	Answer	Marks
6a	Sensor	1
6b	Digital to Analogue Convertor/DAC	1
6c	Actuator/motor	1

Question	Answer	Mark
7a	**Two** from: Touchscreen Camera Microphone	2
7b	**Two** from: Speakers Screen	2

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

Question	Answer	Marks
9	**Four** from: **Advantages** Less wear on the card as it is not used in a device Transaction is quicker Can be read from a pocket No shoulder surfing **Disadvantages** Transaction can be read by hacker's device Does not use a PIN therefore money can be taken if lost Limit on spending on the card If lost the card could be used by anyone so is less secure To gain full marks the description must have correct answers for both advantages and disadvantages	4

Question	Answer	Marks
10(a)	**Three** from: Oxygen Light pH Turbidity	3
10(b)	**Six** from: **Advantages** More accurate results produced Computer does not forget to take a reading Results are processed automatically Readings can be taken at more points as many humans are needed Readings can be taken that would be impossible for humans Data can be analysed continuously Readings can be taken more frequently Safer than using humans Better response time Can work 24/7 Can be placed in remote areas where humans could not work Fewer humans required therefore reducing the cost **Disadvantages** Computer responds less to unusual circumstances Computer equipment can be more susceptible to atmospheric conditions Computer equipment is more likely to be damaged or stolen by vandals **To gain full marks the discussion must have correct answers for both advantages and disadvantages**	6

Question	Answer	Marks
11	Keyboard Digital camera	2

Question	Answer	Marks
12	**Two** from, for example: Sprinkler Lamp Heater Vents/Window openers/Motor Actuator	2

Question	Answer	Marks
13	**Four** from: RFID are faster to read than bar codes RFID scanning is more accurate than bar codes RFID does not need line of sight to read but bar code does RFID will read the data if the reader is further away RFID can scan multiple items at the same time RFID allows greater security RFID can store more data than a bar code RFID tags can be rewritten, so can be reused RFID tags are more robust as bar codes will not scan if damaged	4

Question	Answer	Marks
14	**Two** from: Sensors Keypad/Number pad Touch screen Microphone Camera	2

Question	Answer	Marks
15	**Five** from: Can be used for multiple elements Fast access to additional information Can be linked into a website Can automatically link to email The QR code is unique to the ticket More robust than bar codes Secure as the code cannot be swapped	5

Question	Answer	Marks
16a	**Three** from: Measurements can be taken continually Safer to take the measurements Measurements can be taken outside school hours The computer will not forget to take readings Readings are taken at a more consistent time interval The computer reads the data more accurately	3
16b	**Six** from: The data from the sensor is read/received by the computer The data is converted to digital by the ADC The software is opened on the computer The graph type is loaded/selected The data is uploaded to the graph The graph is plotted/created Axes/legend/title added	6

16c	**Four** from: **Measurement** Automatically detects changes in the environment Measurement takes the readings and stores the result Measures/reads physical quantities **Control** Changes the environment Compares against preset value Action taken depending on comparison to preset value **To gain full marks the description must have correct answers for both measurement and control**	**4**

Question	Answer	Marks
17	**Six** from: **Benefits** Safer to use drones than human life being risked in forest areas Drones can gain a better overall view of the forest than the human Drones can be used in areas that would not be accessible to humans Drones can cover a greater area than a human in the time available Data from the drone can be automatically uploaded to computer system May change animal behaviour if humans are used//Less invasive for the animals **Drawbacks** Damp conditions/environment/weather may cause issues with the electronics Difficult to navigate in the tree areas Noise/sight of the drone may affect the animals More chance of collision/bird attack If drone crashes it could be difficult to find/retrieve Potential danger to other animals/birds **To gain full marks the description must have correct answers for both benefits and drawbacks**	**6**

Question	Answer	Marks
18	**Eight** from: **Advantages** Readings are taken at a more consistent time interval The sensor reads the data more accurately Safer as humans do not need to take the measurements Computers can analyse the data continuously Readings taken more frequently Multiple variables can be monitored at the same time **Disadvantages** Sensors can malfunction due to the temperature If sensors malfunction this could lead to incorrect readings Sensors could be stolen **To gain full marks the discussion must have correct answers for both advantages and disadvantages**	8

Question	Answer	Marks
19	**Four** from: The microprocessor receives the data A preset value for the distance is stored in the microprocessor The microprocessor compares this data to the minimum distance/preset value If the data is less than the preset value the microprocessor sends a signal to the actuator The actuator applies the brakes If the data is more than the preset value the microprocessor does nothing Process is continuous	4

Question	Answer	Marks
20	**Four** from: Data are sent back to the sensor The sensors scan continually The sensor captures the reflected data The sensor captures analogue data The data from the sensor is sent by the ADC	4

Question	Answer	Marks
21a	Double (data) entry	1
21b	**Four** from: An input device sends data to a computer for processing An output device receives data from the computer An output device displays the results of processed data Input devices are controlled by the user Output devices are controlled by the computer	4
21c(i)	QR (Code) reader/scanner	1
21c(ii)	Bar code reader/scanner	1
21c(iii)	Magnetic strip(e) reader/scanner	1
21c(iv)	RFID reader/scanner	1

Question	Answer	Marks
22	**Four** from: The sensor may be above the obstacle and may not detect it Sometimes they detect transient/moving obstacles this can cause the cleaner to get confused The home owner becomes too reliant on the technology The sensors can become obstructed by dirt/dust therefore giving false readings/stop working It cannot clean the whole room due to sensing objects Does not know which parts it has cleaned or not	4
23a	Max **two** from: **Advantages** Faster data entry Fewer data entry errors are made Max **three** from: **Disadvantages** The scanner could misread the barcode whereas people typing in the data are more likely to check Extra hardware is required increasing costs If the bar code is damaged/folded/missing then the data may not be read properly More reliant on the technology If the barcode is incorrect the scanner would not know whereas a human could see the difference	4

Question	Answer	Marks
23b	**Three** from: Magnetic stripe reader Radio Frequency Identification reader Optical Mark Reader Optical Character Reader QR scanner Biometric scanner Magnetic Ink Character Reader	3

Question	Answer	Marks
24	**Two** from: Magnetic stripe reader Radio Frequency Identification (RFID) reader Optical Mark Reader Optical Character Reader Bar code reader QR scanner Biometric scanner	2

Question	Answer	Marks
25a	**Three** from: Monitors Multimedia projector Laser printer / inkjet printer / dot matrix printer Plotter Speaker	3
25b	**Three** from: Programmed to produce the tablet Data is entered The material used in the tablet is mixed (with a binding compound) 3D printer is filled with the mixture / powder Uses a nozzle that ejects a fine spray of the medicine The printer then repeats the process over hundreds of layers Layers build up the tablet	3

Question	Answer	Marks
26a	*Similarities* Max **three** from: Both are attached/connected to a computer Both use digital signals Both handle data Both communicate with both the user and the computer *Differences* Max **three** from: An input device sends data to a computer Input devices are controlled by the user An output device receives data from the computer An output device displays data/plays sound Output devices are controlled by the computer	4
26b	**Three** from: Keyboard Numeric keypad Scanner Camera Microphone Sensor Light pen Mouse	3
26c	**Three** from: Monitors Multimedia projector Printer Plotter Speaker Actuator	3