1. (a) Five sensors and five applications are shown below.

   Draw a line to link each sensor to its most appropriate application.

Sensor	Application
Light sensor	Monitor the pollution levels in a river
Moisture sensor	Control the switching off and on of street lights
Gas sensor	Detect intruders breaking into a building
pH sensor	Monitor the amount of water left in clothes in a dryer
Pressure sensor	Monitor acidity levels in the soil in a greenhouse

[4]

(b) Automatic doors in a building are controlled by the use of infrared sensors and a microprocessor. Describe how the sensors and the microprocessor are used to automatically open a door as a person approaches. ....
....
....
....
....
....
....
....[4]

(2016-Jun-11-02)

2. Motion sensors are used in a security system to detect intruders.

   Name three other sensors that could be used in the following applications. Give a different type of sensor for each application.

Application	Sensor
controlling street lights	
monitoring a river for pollution	
controlling traffic lights	

3. (a) Four hardware items are shown in the table below.

For each hardware item:
- name a suitable application
- state how it is used in the application

Give a different application in each case.

Hardware item	Application	How the hardware item is used
Barcode reader	....	....
Microphone	....	....
Touch screen	....	....
Infrared sensor	....	....

(b) Describe two differences between Blu-ray discs and DVDs.

1 ....

....

2 ....

....[2]

(c) Describe two differences between DVD–R and DVD–RAM.

1 ....

....

2 ....

.... [2]

4. A remote-controlled model car contains RAM, ROM and a solid state drive. The car receives radio signals from its remote control. It can only receive radio signals of a certain frequency. The manufacturer sets this frequency and the owner cannot change it. The owner of the model car can input their own sequence of movements from an interface underneath the car.

Describe the purpose of each of the three types of memory supplied with the car.

RAM ....

....

ROM ....

....

Solid state drive ....

....[3]

(b) The owner needs to be able to enter their own sequence of movements for the model car.

Name a suitable input device.

Input

device ....

....

Give a reason for your choice of device. ....

....

....[2]

(c) Explain why the model car uses a solid state drive rather than another type of secondary storage.

....

....

....

.... [2]

5. A section of computer memory is shown below:

Address	Contents
1000 0000	0110 1110
1000 0001	0101 0001
1000 0010	1000 1101
1000 0011	1000 1100
1000 1100	
1000 1101	
1000 1110	
1000 1111	

(a) (i) The contents of memory location 1000 0001 are to be read.

Show the contents of the Memory Address Register (MAR) and the Memory Data Register (MDR) during this read operation:

MAR

MDR

(ii) The value 0111 1001 is to be written into memory location 1000 1110.

Show the contents of the MAR and MDR during this write operation:

MAR

MDR

(iii) Show any changes to the computer memory following the read and write operations in part (a)(i) and part (a)(ii).

Address	Contents
1000 0000	0110 1110
1000 0001	0101 0001
1000 0010	1000 1101
1000 0011	1000 1100
1000 1100	
1000 1101	
1000 1110	
1000 1111	

(b) Name three other registers used in computers.

1...

2...

3 .... [3]

(c) The control unit is part of a computer system.

What is the function of the control unit?

....

....

....

....

....

.... [3]

(2015−oct−13−03)

6. Explain what is meant by primary, secondary and off-line storage. Give an example of each.

Primary storage

....

....

....

Example ....

Secondary storage

....

....

....

Example ....

Off-line storage

....

....

....

Example ....[6]

(b) A set of photographs has been taken for a wedding. All the guests are to be sent digitally stored copies through the ordinary postal service. There are fifty photographs and each photograph is between 1.8 and 2.5 megabytes in size. Work out the maximum storage space required for a set of photographs. State, with a reason, a suitable medium to use for the copies to be sent to the guests.

Maximum storage space

....

....

Medium..

Reason ....

....

....[3]

7. Signals are sent to and from the components of a processor using buses.

    Identify and describe the purpose of two different buses.

    Bus 1 ....

    Purpose ....

    ....

    ....

    ....

    ....

    ....

    Bus 2 ....

    Purpose ....

    ....

    ....

    ....

    ....

    ....[6]

8. Complete the paragraph by choosing six correct terms from the list.

    • Optical
    • On-line
    • RAM
    • HDD
    • Primary
    • SSD

- Secondary
- ROM
- Off-line

A computer has two different types of memory. .... memory is not directly accessed by the CPU, but it allows a user to store data that can easily be accessed by applications. Two examples of this type of memory are .... and .... The second type of memory is .... memory. This memory is directly accessed by the CPU. It allows the processor to access data and instructions that are stored in this memory. Two examples of this memory are .... and .... [6]

9. Give two examples of primary, secondary and off-line storage.

Primary

Example 1 ....

Example 2 ....

Secondary

Example 1 ....

Example 2 ....

Off-line

Example 1 ....

Example 2 ....[6]

10. The diagram shows five output devices and five descriptions.

Draw a line between each output device and its description.

Output Device	Description
Inkjet printer	Flat panel display that uses the light modulating properties of liquid crystals.
LCD screen	Flat panel display that uses an array of light-emitting diodes as pixels.
2D cutter	Droplets of ink are propelled onto paper.
LED screen	Electrically charged powdered ink is transferred onto paper.
Laser printer	High powered laser that uses the x-y plane.

(2018-oct-11-01)