AQA Computer Science A-Level
4.7.4 External hardware devices
Past Paper Questions

Additional Specimen Paper 2

0 5 . 3 When purchasing the storage devices to use in the Network Attached Storage device, a choice had to be made between buying Solid State Drives (SSDs) and traditional hard disk drives.

Discuss the merits of each of these two types of storage device for this application.

[3 marks]

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0 5 . 4 Describe the principles of operation of a Solid State Drive (SSD).

[4 marks]

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8 (a) Write in the appropriate cells in **Table 2**, the names of the secondary storage media listed below that most closely match the given typical storage capacities. You may use each medium more than once.

DVD-R   flash memory card   magnetic hard disk   CD-ROM   magnetic tape cartridge

Table 2

Typical Capacity	Storage Medium
10 Gigabytes – 2 Terabytes	
10 Gigabytes – 800 Gigabytes	
128 Megabytes – 8 Gigabytes	
2.8 Gigabytes – 4.7 Gigabytes	
600 Megabytes – 700 Megabytes	

(5 marks)

8 (b) Which of the **above** storage media would be most suitable to

8 (b) (i) distribute software? ....

(1 mark)

8 (b) (ii) backup large data files? ....

(1 mark)

11 A Radio Frequency Identification (RFID) system is made up of a transponder built into an RFID tag and an interrogator or reader. One example of use is to detect unauthorised removal of library books from a library.

Explain the principles of operation of this RFID system.

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(2 marks)

9 A supermarket uses a computerised stock control system. Each product is identified by a unique product code which is printed on the product as a bar code. The bar codes are input into the stock control system at the till using a bar code reader. One of the digits in the bar code is a check digit.

9 ‖780748‖782963‖

9 (a) Describe the principles of operation of a bar code reader, **excluding** the use of the check digit.

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(4 marks)

9 (b) Explain the purpose of the check digit.

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(1 mark)

9 **(c)** Some unpackaged items such as loose fruit and vegetables do not have a product code printed on them.

Name an input device that the till operator could use to enter details of these items.

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(1 mark)

5 Compare the principles of operation of a laser printer and an inkjet printer when printing. Do **not** include information about how the data is transferred from the computer to the printer.

In your answer you will be assessed on your ability to use good English, and to organise your answer clearly in complete sentences using specialist vocabulary where appropriate.

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(8 marks)

January 2012 Comp 2

4　　There are various formats of optical storage media currently available.

4 (a)　　Choose the most appropriate medium from the list below that would be best suited to the purpose given. Write your answer in the Medium column in **Table 2**. You must **not** use the same medium more than once.

CD-ROM, CD-R, CD-RW, DVD-R, DVD-RW, Blu-Ray

Table 2

Purpose	Medium
To distribute 300MB of commercial software	
To store a 20GB high definition movie file	
To use for a 3GB archive of the data on a school server	
To create a copy of a 60 minute audio music album	

(4 marks)

4 (b)　　Describe how data is written to and read from a CD-R disk.

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(3 marks)

4 (c)   A series of word-processed documents have been archived onto CD-R.

State **two** reasons why in 20 years' time it might be impossible to open up these documents.

Reason 1: ....

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Reason 2: ....

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(2 marks)

January 2013 Comp 2

5   In 1995, a high capacity hard disk drive had a storage capacity of 512 megabytes. In 2012, a typical hard disk drive of the same physical size had a capacity of 1 terabyte.

5 (a)   Describe the principles of operation of a hard disk drive.

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(4 marks)

5 (b) How many times greater is the storage capacity of a 1 terabyte hard disk drive than that of a 512 megabyte hard disk drive?

Show each stage of your working.

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(1 mark)

Final answer ....
(1 mark)

5 (c) Give **one** development in the design of hard disk drives that has enabled this increase in storage capacity.

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(1 mark)

5 (d) If you are considering purchasing a high-end desktop or laptop you might be offered the option of a solid-state drive (SSD) rather than a traditional hard disk drive.

A solid-state drive is a data storage device that uses solid-state memory, similar to that in USB flash drives (memory sticks), to store data that is accessed in a similar way to a traditional hard disk drive.

Ignoring any differences in price and assuming that both drives have the same capacity, state **two** reasons why you might choose the solid-state drive.

Reason 1 ....

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Reason 2 ....

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(2 marks)

June 2010 Comp 2

4 Some European governments are introducing electronic passports for their citizens. An electronic passport stores data about the passport holder using a Radio Frequency Identification (RFID) tag.

4 (a) An electronic passport stores data about some biometric properties of the passport holder.

4 (a) (i) What is meant by the term *biometric property*?

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(1 mark)

4 (a) (ii) Give an example of a specific biometric property that could be stored on a passport to identify the holder.

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(1 mark)

4 (b) Explain how the RFID tag could be read at passport control in an airport.

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(2 marks)

5   CD-ROM, CD-RW, Flash Memory Card and Magnetic Tape are all different types of storage media.

Complete **Table 1**, indicating which of these storage media would be the most suitable to use in the situations described. You should **not** use the same medium more than once.

Table 1

Situation	Suitable Medium
Storing photographs in a compact digital camera, as they are taken	
Making a backup copy of 1,000 gigabytes of data, stored on a network file server	
Distributing a software package to home computer users	

(3 marks)

June 2011 Comp 2

8 (a)   **Table 1** lists the approximate storage capacities of various secondary storage media.

Complete **Table 1**, indicating which of the storage media from the list most closely matches the given storage capacities. You should **not** use the same medium more than once.

Blu-ray, Magnetic Hard Disk, Flash Memory Card, DVD+R, CD-R.

Table 1

Typical Capacities	Storage Medium
40 gigabytes – 2 terabytes	
4.7 – 8.5 gigabytes	
512 megabytes – 128 gigabytes	
600 – 800 megabytes	

(4 marks)

8 (b) Explain why a customer may prefer to buy software on DVD medium rather than downloading it.

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(2 marks)

8 (c) DVD disks are the same physical size as a CD.

Why is the storage capacity for a DVD disk far larger than that of a CD?

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(1 mark)

June 2012 Comp 2

6 (a) Here is a list of input devices:

smart card reader, Radio Frequency Identification (RFID) reader, touch-sensitive screen.

For each of the situations below, state the name of the most appropriate input device from the list above. You should **not** use the same device more than once.

6 (a) (i) Information kiosk at a railway station

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(1 mark)

6 (a) (ii) Payment for food at a school canteen

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(1 mark)

6 (a) (iii) To identify a book being removed from a library without authorisation

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(1 mark)

3   Secondary storage devices include:

Fixed internal hard disk drives, Magnetic tape drives, DVD-R drives and USB flash drives.

For each of the scenarios below, identify the **most appropriate** device from the list above and also explain why this device is appropriate.

You should **not** use the same device more than once.
You should **not** give the same reason more than once.

To transfer a 100 KB word processed document from one computer to another.

Device ....

Reason ....

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To store a backup of the 700 GB of user data stored on a school server.

Device ....

Reason ....

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To produce copies of a software executable for distribution to customers.

Device ....

Reason ....

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(6 marks)

4   A school robotics club has recently purchased a robotics kit after the teacher in charge saw an advert in a magazine. The advert is reproduced below.

RoboEddy - a new educational robot

Specification

    Hardware

        500 Mhz processor
        32 MB RAM
        4 timers
        Wi-Fi communications via WLAN 802.11g radio
        Dual H-bridge motor driver

    Software

    Built in interpreter for the high level language RobotC
    Directly run assembly code
    XMODEM protocol for reliable file transfer
    Support for various analogue and digital sensors
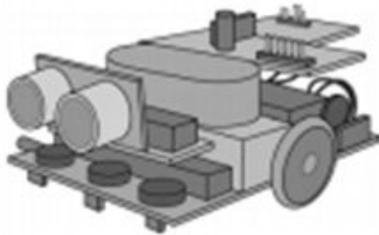
Available NOW!

Only £199

4 (f)   The robot identifies the colour of the balls using a digital still camera component.

4 (f) (i)   Describe the principles of operation of a digital still camera.

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(3 marks)

4 (f) (ii)   The digital still camera component can take high resolution images but the students
have chosen to program it to take low resolution images instead.

Give a reason why the students might have only used a low resolution.

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(1 mark)

0 8 The organisers of a marathon race have installed checkpoints at regular intervals along the course. The time at which each competitor passes a checkpoint is recorded.

0 8 . 1 Three input devices that could be used at each checkpoint to capture data automatically as competitors pass by are:

- barcode reader
- digital camera
- RFID reader.

The race organisers decide to use RFID readers. Evaluate the suitability of all three devices **and** explain why RFID is the most appropriate choice.

[6 marks]

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The computer used by the race organisers has a built-in magnetic hard disk drive, a built-in solid-state disk and an optical disk drive.

0 8 . 2 State **two** reasons why the computer has a magnetic hard disk and a solid-state drive instead of using only solid-state storage.

[2 marks]

Reason 1: _____

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Reason 2: _____

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0 8 . 3 State **two** hardware components of a solid-state drive.

[2 marks]

Component 1: _____

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Component 2: _____

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June 2017 AS Paper 2

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A laser printer has a representation of an image stored in its memory.

Describe how it prints this image on to a piece of paper.

[6 marks]

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June 2009 Comp 2

1 (b) The table below lists two peripherals.

Put **one** tick in each row to identify each peripheral as either an input, output or I/O device.

Peripheral	Input	Output	Input/Output (I/O)
Mouse			
Laser Printer			

(2 marks)

12 (a) Give **two** differences between primary and secondary storage.

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(2 marks)

12 (b) Explain the principles of operation of a hard disk drive.

Your answer to this question will also be assessed on your ability to organise your answer clearly and coherently in complete sentences, using specialist vocabulary where appropriate.

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(6 marks)

Specimen AS Paper 2

0 7 A well-established use for robots in industry is the spraying of car bodies on a car production line.

A robotics researcher is investigating the feasibility of developing and installing in a car a computer-based control system to take over completely the driving of the car on public highways.

She has identified some of sources of inputs into the control system already:

- high resolution video camera
- stereoscopic digital camera
- long range radar
- short range radar
- Global Positioning Satellite receiver.

And some of the outputs:

- position of steering wheel (in degrees from the vertical)
- forces on accelerator and brake pedals.

Discuss why automated car control is a harder programming problem to solve than developing programmed control of a robot for spraying car bodies on a car production line, and what processing of input data will be necessary and why to obtain sufficient information to safely and reliably control the driving of the car by computer. Include in your discussion the sources of input that you have used and the information derived from these by processing.

[9 marks]

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A flight recorder is an electronic recording device placed in an aircraft for the purpose of facilitating the investigation of aviation accidents and incidents **Figure 3** shows an example of a flight recorder. It is a requirement for every commercial aircraft to have a type of flight recorder called a cockpit voice recorder.

Figure 3

0 8 . 1 Current cockpit voice recorders use solid-state memory chips to store the digital audio data. Alternatively, the data could be stored on a traditional hard disk drive.

Give **two** reasons why cockpit voice recorders store data using solid-state memory instead of using a traditional hard disk drive.

[2 marks]

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Specimen Paper 2

0 4

The phrase "Internet of Things" is used to describe the connection of many everyday devices such as home heating controls, utility meters, cars and environmental sensors to the Internet. It is believed that tens of billions of devices will be connected to the Internet of Things by the end of the decade.

One anticipated use of the Internet of Things is to monitor the food that consumers have inside their fridges. This data could be gathered automatically from consumers' devices by retailers who sell food. Retailers could use the data to analyse consumer consumption habits or automatically prepare deliveries for customers.

In the context of an Internet connected fridge, discuss the technologies that will be required to make the Internet of Things work.

You may wish to consider how the data might be captured, how networking technologies are changing to provide the necessary infrastructure, and how the data gathered by retailers could be stored and processed, from a hardware and software viewpoint.

[12 marks]

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