



1.3.5 Memory, storage devices and media

May/June 2005 (9691)

2. (a) State two differences between random access memory (RAM) and read only memory (ROM). [2]
- (b) Describe what is stored on
- (i) RAM,
 - (ii) ROM
- explaining why that type of memory is appropriate. [4]

Oct/NOV 2005 (9691)

1. An office worker is responsible for communicating with other businesses and managing the computer systems in the office.
- (c) State a sensible use that the office worker could make of
- (i) a hard disk,
 - (ii) a rewritable CD (CD-RW),
 - (iii) a CD-ROM. [3]

May/June 2006 (9691)

1. (a) Explain the differences between RAM and ROM, stating a use for each. [4]
- (b) A shopkeeper uses a stand-alone computer for producing
- order forms for sending to suppliers
 - records of sales and purchases as evidence for the taxation authorities
 - leaflets advertising special offers.
- (ii) The computer has a hard drive, a CD-RW drive and a DVD drive. State a different use, by the shopkeeper, for each of these three storage media. In each case say why it is appropriate for that use. [6]

May/June 2006 (7010)

- 1 Explain, using examples where appropriate, the meaning of these computer terms.
(c) Read Only Memory (ROM) [2]

May/June 2007 (9691)

1. A student uses her home computer to:
- play games which she gets from a library;
 - finish work that she brings home after starting it at school;
 - produce a finished copy of the work to hand in to her teacher;
 - communicate with her friends.
- State the peripheral devices, apart from keyboard, mouse and monitor, which she would need.
Explain why each would be necessary. [8]

Oct/NOV 2007 (9691)

3. (a) State one difference between random access memory (RAM) and read only memory (ROM). [1]
- (b) State three types of data stored in RAM. [3]
- (c) An embedded processor contains all the software needed to control an automatic washing machine.





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- (i) State why the software is stored on ROM. [1]
- (ii) Explain why it is important that ROM has some of the characteristics of RAM. [2]

8. Data collected at the survey site is sent, electronically, to the head office of the company for processing.
- (a) Describe the hardware necessary to enable this communication. [3]
 - (b) (i) The results of the analysis of the data are often output on a plotter. Give two advantages of outputting this data to a plotter. [2]

Oct/NOV 2007 (7010)

1 Explain, with examples, the following five computer terms:

- (a) byte [2]
- (b) CD-ROM [2]

May/June 2008 (7010)

10 A computer system comes equipped with DVD writer/reader, hard disk drive and RAM.

(a) Give a different use for each of these forms of memory.

- DVD
- Hard Disk
- RAM

(b) Give another example of a memory device and give one advantage of the named device.

May/June 2008 (9691)

3. (a) (i) State two types of data stored in RAM when a computer is running. [2]
- (ii) State one piece of software which is entirely contained in ROM and say why it is stored in ROM rather than RAM. [2]

Oct/NOV 2008 (9691)

1. A computer system is used to monitor and control the temperature of the water in a fish tank.

- (b) State an example of each of the following types of device which would be necessary in the computer system and state what they would be used for.
- (i) An input device
 - (ii) An output device
 - (iii) A storage device [6]

8. The workers in the office use three different types of storage medium. For each of the three types, state a use to which the medium could be put and justify your answer.

- (i) Hard Disk
- (ii) DVD-RW
- (iii) CD-ROM [6]

May/June 2009 (9691)

1. (b) A printer is a hard copy output device.





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State three different types of printer.

For each of your choices give an example of an application where it would be used, justifying your choice. **[9]**

Oct/NOV 2009. P12 (9691)

1. A student has a stand-alone computer at home and also uses the computers at school. She uses a USB stick, a DVD-RW drive and a CD-ROM drive on her home computer.

(a) State a use that the student could make of each of the following, justifying your choices.

- (i) USB stick **[2]**
- (ii) DVD-RW drive **[2]**
- (iii) CD-ROM drive. **[2]**

(b) State one other storage device that the student would need at home and say why it would be needed. **[2]**

May/June 2009 (7010)

A company produces animation effects using computers rather than producing them manually.

(b) Each image takes about 400 kilobytes of storage. 25 images per second are produced. How much memory would be needed to store a 30-minute animation?

May/June 2010. P11 (9691)

1. (a) (i) State two differences between ROM and RAM. **[2]**
(ii) State one piece of software which must be stored in a computer's ROM, justifying your answer. **[2]**

(b) State two pieces of hardware, apart from the PCs, which would be needed in order to enable two computers to communicate. Justify your answers. **[4]**

2. Goods in a shop are labelled with barcodes. These barcodes are used when goods are sold at the checkout. The shop uses a computer system, attached to the checkout, to store a file of records relating to the goods on sale.

(a) State appropriate peripheral hardware for this system, justifying your choices. **[8]**

3. A computer system is used in a tourist souvenir shop. Customers can have their pictures taken. The picture is stored on the system. After the customer approves the image it is printed onto a T-shirt.

Explain how this system works, by describing the hardware, software and data storage. **[6]**

May/June 2010. P12 (9691)

1. (a) (i) State two differences between ROM and RAM. **[2]**
(ii) State one piece of software which must be stored in a computer's ROM, justifying your answer. **[2]**





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May/June 2010. P13 (9691)

1. (a) (i) State two features of RAM which would not be true of ROM. [2]
(ii) State two pieces of software found in RAM when a computer is processing data. [2]

Oct/Nov 2010 P11 (7010)

Explain, using examples where appropriate, the following five computer terms:

- USB flash memory
- RAM

Oct/Nov 2010 P13(7010)

1. Explain, with examples where appropriate, the following five computer terms.
(b) Optical media

3 A typical computer system contains the following four components:

- _ RAM
- _ ROM
- _ hard disk
- _ modem

Describe the function of each of these components.

[4]

May/June 2011 P12 (7010)

Name THREE different types of storage media and give an example of each.

May/June 2011. P12 (9691)

A supermarket has a number of point-of-sale terminals.

Data is read from goods at the terminals and information is produced.

1. (b) State two output devices which would be used at the point-of-sale, giving a reason for their use. [4]

May/June 2011. P13 (9691)

A cinema has a number of places where customers can buy their tickets.

Data is input by the cashiers at the terminals and information is produced.

1. (b) State two input devices which would be used at the terminals, justifying their use. [4]

5. (a) (i) Explain two differences between ROM and RAM as types of primary memory. [2]
(ii) State an example of what would be stored in ROM and justify your answer. [2]
(iii) State an example of what would be stored in RAM and justify your answer. Example Justification [2]
(b) (i) Explain the problem of speed mismatch between peripheral and processor.





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(ii) Describe how this speed mismatch can be overcome. [5]

Oct/NOV 2011. P11 (9691)

- 1 (a) Describe the purpose of storage devices.
(b) A student has a computer at home as well as using computers at school. [2]
State two different storage devices that the student would use on her computer and explain what she would use each for. [4]

6 An air conditioning system is used to control the temperature in a room.
State an example of each of the following types of peripheral which would be used on the system giving a use for each.

- (i) An input device [2]
(ii) An output device [2]

Oct/NOV 2011. P12 (9691)

6 State an example of each of the following types of storage medium and give a use for each.

- (i) Magnetic [2]
(ii) Solid state [2]

Oct/NOV 2011. P13 (9691)

6 State two different types of optical storage medium.
Give a use that a school student could make of each with their computer at home. [4]

May/June 2012 P12 (7010)

7 The electronic equipment contains RAM and ROM. Give one use of each type of memory. [2]

12 (a) John has bought a 4 Gbyte MP3 player.

(You may assume: 1 byte = 8 bits, 1 Mbyte = 1024 kbytes and 1 Gbyte = 1024 Mbytes)

(i) We can assume that each song lasts 3 minutes and is recorded at 128 kbps (kilobits per second).

How much memory is required per song? [2]

(ii) Using your answer in (i), how many songs can be stored on John's MP3 player? [2]

(b) John also bought a device for recording television programmes. It allows him to record a programme at the same time as he is watching an earlier recording.

Describe how such a system would work.

May/June 2012. P11 (9691)

- 1 (a) (i) Give two differences between ROM (Read Only Memory) and RAM (Random Access Memory) [2]
(ii) State a program stored in ROM, giving a reason why it must be stored in ROM. [2]
(iii) State the purpose of this program. [1]

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- 1 (a) (i) Give two differences between ROM (Read Only Memory) and RAM (Random Access Memory). [2]
- (ii) State why user files currently being used are stored in RAM. [1]
- (iii) State two types of software which would be found in RAM. [2]

Oct/Nov 2012 P12 (7010)

The following statistics refer to a music track being recorded on a CD:

- music is sampled at 44 100 times per second
- each sample is 16 bits
- each track requires separate sampling for left and right speakers of a stereo recording (8 bits = 1 byte, 1 megabyte = 1 048 576 bytes)

(a) (i) How many bytes are required to represent one second of sampled music?

[2]

(ii) If a typical music track is 3 minutes long, how much memory is used on the CD to store one track? (Give your answer in megabytes.)

May/June 2013 P12 (7010)

Four types of data storage media and four descriptions are shown in the table below.

Tick the appropriate boxes in the table to match each data storage medium to its most suitable description.

	CD-ROM	DVD-RAM	fixed hard disk	memory stick
storage medium where data can only be read and not altered				
portable medium which allows transfer of data between computers				
memory where operating systems and applications software are usually stored				
medium which allows recording and playback to occur at the same time				

[4]





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Three common devices are listed below:

- MP3 player
- digital camera
- mobile phone

(a) Choose one of the above devices.

Describe the type of internal memory the device uses.

Describe how data is transferred from the device to a computer.

May/June 2013. P11/P12 (9691)

- 2 (a) State three different types of secondary storage media.
Explain how digital data is stored on each. [6]
- (b) A remote-controlled toy car contains both RAM and ROM. The car can be programmed to carry out a number of manoeuvres.
- (i) Describe the main differences between RAM and ROM. [2]
- (ii) How are the two types of memory used in the car? [2]

May/June 2013 P12 (7010)

7 The speed at which a CD spins in a portable music CD player is controlled by sensors and a small microprocessor.

(a) Describe how the sensors and microprocessor are used to control the speed of the spinning CD. [4]

(b) Sudden movements can make the CD "skip".

How can the microprocessor deal with this so that the CD operates correctly? [2]

(c) Why would an MP3 player not suffer from the same problem? [1]

Memory Size Calculation:

1. A company produces animation effects using computers rather than producing them manually.
(b) Each image takes about 400 kilobytes of storage. 25 images per second are produced. How much memory would be needed to store a 30-minute animation?
2. Juan uses a company which offers the following Internet broadband transfer rates:
- 56 megabits per second DOWNLOAD
 - 16 megabits per second UPLOAD
- (b) If each music track is 3.5 megabytes in size, how long would it take Juan to download his 40 tracks?
(Show your working.)
- (c) He has decided to upload 36 photographs onto his social networking website. Each photograph is 1.8 megabytes in size. How long would it take to upload his photographs?
3. John has bought a 4 Gbyte MP3 player.
(You may assume: 1 byte = 8 bits, 1 Mbyte = 1024 kbytes and 1 Gbyte = 1024 Mbytes)
- (i) We can assume that each song lasts 3 minutes and is recorded at 128 kbps (kilobits per second).





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How much memory is required per song?

4. A digital security camera was set up as shown in the diagram. The digital CCTV camera is connected to a computer. The computer can make the camera move in any direction by sending out digital signals. The computer system has a 400 gigabyte hard disk. Each image size is 400 kilobytes (0.4 gigabytes).
 - (i) How many images can be stored before the hard disk is full?
5. Computer memories are measured in terms of the number of bytes.
 - (i) What is meant by the term byte?
 - (ii) What is meant by a Gigabyte?
 - (b) Flash memories and CD-RWs are used as backing media for computers. Give two differences between these two media.
6. The following statistics refer to a music track being recorded on a CD:
 - music is sampled at 44 100 times per second
 - each sample is 16 bits
 - each track requires separate sampling for left and right speakers of a stereo recording (8 bits = 1 byte, 1 megabyte = 1 048 576 bytes)
 - (a) (i) How many bytes are required to represent one second of sampled music?
 - (ii) If a typical music track is 3 minutes long, how much memory is used on the CD to store one track? (Give your answer in megabytes.)





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5 Five storage devices are described in the table below.

In column 2, name the storage device being described.

In columns 3, 4, or 5, tick (✓) to show the appropriate category of storage.

1	2	3	4	5
Description of storage device	Name of storage device	Category of storage		
		Primary	Secondary	Off-line
optical media which use one spiral track; red lasers are used to read and write data on the media surface; makes use of dual-layering technology to increase the storage capacity				
non-volatile memory chip; contents of the chip cannot be altered; it is often used to store the start up routines in a computer (e.g. the BIOS)				
optical media which use concentric tracks to store the data; this allows read and write operations to be carried out at the same time				
non-volatile memory device which uses NAND flash memories (which consist of millions of transistors wired in series on single circuit boards)				
optical media which use blue laser technology to read and write data on the media surface; it uses a single 1.1 mm polycarbonate disc				

[10]

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9 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.

(a) Describe the purpose of each of the three types of memory supplied with the car. [3]

(c) Explain why the model car uses a solid state drive rather than another type of secondary storage. [2]

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5 A security system records video footage. One minute of video requires 180 MB of storage. The recording system can store several hours of video footage.

(a) Name and describe a suitable storage device for this recording system.

[2]

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11 (a) Four examples of optical storage media are:

- DVD-RW
- DVD-RAM
- CD-ROM
- Blu-ray disc

The table below shows four features of optical storage media.

Tick (✓) the appropriate boxes in the table to indicate which of the features apply to each example of optical storage media.

	Single track	Many concentric tracks	Blue laser used to read/write data	Red laser used to read/write data
DVD-RW				
DVD-RAM				
CD-ROM				
Blu-ray disc				

[4]

(b) Solid state drives (SSD) are replacing hard disc drives (HDD) in some computers.

(i) Give **three** reasons why this is happening.

[3]

(ii) Explain why many web servers still use hard disc drive (HDD) technology.

[2]

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10 There are **six** descriptions in the table below.

Complete the table below by writing the correct storage device or media in the box next to each description.





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Description	Storage device or media
Non-volatile memory that can only be read from and not written to.	
Optical storage media that allows very high storage capacity by using blue/violet laser technology.	
Volatile memory that stores data, programs and the parts of the operating system that are currently in use.	
Optical storage media that uses a single spiral track and uses dual layer technology, allowing high data storage capacity.	
Device that stores data by controlling the movement of electrons within a microchip; there are no moving parts.	
Optical storage media that uses concentric tracks allowing writing and reading to take place at the same time.	

[6]

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6 Four computer terms and **eight** descriptions are shown below.
Draw lines to connect each computer term to the correct description(s).





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Computer term	Description
Arithmetic and logic unit (ALU)	Data can be read but not altered Carries out operations such as addition and multiplication
Control unit	Stores bootstrap loader and BIOS Fetches each instruction in turn
Random access memory (RAM)	Carries out operations such as AND, OR, NOT Stores part of the operating system currently in use
Read only memory (ROM)	Stores data currently in use Manages execution of each instruction

[4]

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

- Optical
- On-line
- RAM
- HDD
- Primary
- SSD
- Secondary
- ROM
- Off-line





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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]

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

[6]

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2 Storage devices and storage media can be categorised as primary, secondary or off-line. Write **primary**, **secondary** or **off-line** next to each storage device or medium to indicate its most suitable category.

HDD
RAM
ROM
CD-ROM
SSD
DVD-RAM

[6]

8 (a) A computer has 2048 MB of RAM.
How many GB of RAM does the computer have?
Show your working.

[2]

(b) Describe **one** item that is stored in RAM.

[2]

(c) Explain **three** ways that RAM is different to ROM.

[3]

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9 (a) Optical storage media can be used to store data. Describe how the data is read from a Compact Disc (CD).

[4]





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8 (d) The supermarket uses secondary storage and off-line storage to store data about its stock. Explain what is meant by secondary storage and off-line storage.

