Chhetri Academy

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GCSE COMPUTER SCIENCE

1.2

OCR J277 | Specification point 1.2.1

Primary storage (memory)

Untiered

Past paper question booklet

8	2014-2024	Untiered
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

2 A computer has 1024 megabytes of RAM.

(a) How many gigabytes of RAM does the computer have?

.....

..... **[1]**

(b) State **two** items that will be stored in the RAM.

1 .....

.....

2 .....

..... **[2]**

(c) The computer sometimes uses virtual memory.

Describe what is meant by virtual memory **and** state why it is needed.

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..... **[3]**

4 Alicia has designed a computer using Von Neumann architecture.

(a) Describe the purpose of **two** registers that are used by Von Neumann architecture.

1 .....

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2 .....

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[4]

(b) The CPU has a clock speed of 3.8 GHz.

Describe what is meant by a clock speed of 3.8 GHz.

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..... **[2]**

(c) Alicia says:
"My computer has a quad-core processor, so it will run twice as fast as a computer with a dual-core processor."

Explain why this statement is not always true.

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..... **[3]**

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Turn over

(d) The computer will only have 2GB of RAM, but Alicia says that virtual memory can be used instead of adding more RAM.

(i) Explain how virtual memory can compensate for the lack of RAM in Alicia's computer.

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..... **[3]**

(ii) Explain why it would be beneficial for Alicia to get more RAM instead of relying on virtual memory.

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..... **[2]**

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1 Kerry wants to buy a new computer, but she does not understand what the different parts of a computer do.

(a) Kerry has heard of a CPU but does not know what it is.

(i) The following sentences describe the purpose of a CPU.

Complete the sentences by filling in the missing words.

CPU stands for ..... .

It is the part of the computer that fetches and executes the .....

that are stored in ..... .

The CPU contains the Arithmetic ..... Unit (ALU) and

the ..... Unit (CU).

[5]

(ii) Kerry is looking at two computers; one has a single core processor and the other has a dual core processor.

Explain why having a dual core processor might improve the performance of the computer.

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..... **[2]**

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(iii) One computer has 64 kilobytes of cache and the other has 512 kilobytes of cache.

Explain how the cache size can affect the performance of the CPU.

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..... **[2]**

(b) Both computers have RAM and ROM.

(i) The table has **five** statements describing RAM and/or ROM.

Tick (✓) **one or more** boxes in each row to identify if that statement describes RAM and/or ROM.

	RAM	**ROM**
Stores data		
The memory is volatile		
Data will not be lost when the computer is turned off		
Data is read-only, cannot be changed		
Stores currently running data and instructions		

[5]

(ii) Give **one** difference between RAM and flash memory.

.....

..... **[1]**

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Turn over

(c) Kerry has 5GB of files to transfer from her laptop at work to her new computer. She has been told to buy an external solid state device to do this.

(i) Give **one** example of a solid state device.

.....

..... **[1]**

(ii) Identify whether the device given in **part (c)(i)** is an example of primary or secondary memory.

.....

..... **[1]**

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(iii)* Kerry was originally going to use an optical storage device to transfer her files.

Discuss whether an optical or solid state device is the most appropriate media to transfer these files.

You may want to consider the following characteristics in your answer:

- portability
- robustness
- capacity
- cost

[8]

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Turn over

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(iv) The filesizes of Kerry's files are usually displayed in megabytes (MB) or gigabytes (GB).

Calculate how many MB are in 5GB. Show your working.

..... MB **[2]**

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5 Ali's tablet computer has an operating system.

(a) Complete the following description of the functions of an operating system by selecting the appropriate missing words from those in the box.

user	drivers	directories	hardware	interface	multitasking
output	peripherals	printers	processor	RAM	utility
ROM	running	passwords	faster	volatile	virtual

The operating system provides a user ..... . This displays the output to the user and allows the user to interact with the ..... .

The operating system controls the movement of data from secondary storage to ..... and vice-versa. This is known as memory management.

The operating system can only perform one process at a time, but by managing the memory the computer can appear to be completing more than one process at a time. This is known as ..... .

An operating system allows device ..... to be installed to allow an external piece of hardware to interact with the ..... .

The operating system provides security through user accounts and ..... . It also creates and maintains a file system to organise files and ..... . **[8]**

(b) Ali runs defragmentation analysis on his magnetic hard disk. Parts of the results are shown.



	File 1
	File 2
	File 3
	Free space

(i) Explain how defragmentation will change how the files and free space are arranged on Ali's hard disk.

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..... **[3]**

(ii) After defragmentation, Ali's computer is able to access files faster.

Explain why Ali's computer can access the files faster after defragmentation.

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..... **[2]**

(iii) Give **three** additional examples of utility programs.

1 .....

2 .....

3 .....

[3]

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(c) Ali's computer uses virtual memory. Ali has written two procedures to help himself understand how virtual memory works.

`storeData()` describes how data is stored in RAM.
`accessData()` describes how data is read from RAM.

Write the letter of the missing statements from the table in the correct place to complete the algorithms. Not all statements are used, and some statements might be used more than once.

```
procedure storeData()
    if RAM is ..... then
        move data from RAM to .....
    endif
    store data in next free space in .....
.....
procedure accessData()
    if  ..... (data required is in RAM) then
        if RAM is full then
            move unneeded data from RAM to HDD
        endif
        move required data from HD to RAM
    endif
    read data from .....
endprocedure
```

Letter	Statement
A	Secondary storage
B	NOT
C	Full
D	endfunction
E	Empty
F	endprocedure
G	AND
H	RAM

[6]

(d) Ali's tablet computer also has ROM (read only memory).

Describe the purpose of ROM in Ali's tablet computer.

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..... **[2]**

(e) Ali thinks his tablet is an embedded system.

State whether Ali is correct or incorrect, justifying your choice.

Choice .....

Justification .....

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.....

[3]

(f) Ali's tablet computer has 100 GB of secondary storage. There is currently 80 GB available.

Ali wants to transfer a series of video clips onto his tablet. Each video is, on average, 200 000 kilobytes.

Calculate an estimate of the number of video clips Ali can fit onto his tablet.

Show your working.

Working: .....

.....

.....

.....

Answer: .....

[4]

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1 A computer system has a 2.5 GHz processor and 5 GB of RAM.

(a) Complete the paragraph about memory by writing the missing terms in the spaces, using the words provided.

cache	data	hard drive	instructions	changed	closing
operator	primary	random	read	secondary	start-up
translator	memory stick	virtual	write		

ROM stands for ..... only memory. This stores the ..... instructions for a computer and cannot be ..... .

RAM stands for ..... access memory. This stores the instructions and ..... that are currently being used. If the computer does not have enough RAM to run a process it can make use of ..... memory.

RAM and ROM are both examples of ..... memory. Memory located close to the processor that allows faster access than from RAM is called ..... memory. **[8]**

(b) **(i)** State the purpose of a CPU.

.....

..... **[1]**

(ii) State what is meant by a single core 2.5 GHz processor.

.....

.....

.....

..... **[2]**

(c) Von Neumann architecture includes registers.

Identify **two** registers used in Von Neumann architecture.

1 .....

2 .....
[2]

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7 A smart television allows the user to search the Internet and watch videos online.

(a) The smart television has both RAM and ROM.

(i) State the difference between RAM and ROM.

.....

..... **[1]**

(ii) Give **two** examples of data that the smart television could store in RAM.

1 .....

2 .....

[2]

(b) The smart television has secondary storage.

(i) State, using an example, why the smart television needs secondary storage.

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..... **[2]**

(ii) Identify **one** appropriate type of secondary storage for the smart television. Justify your choice.

Secondary storage type .....

Justification .....

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[4]

5 An artist has a computer that they use to create images.

Their computer has both hardware and software.

(a) The hardware includes primary and secondary storage.

(i) Explain why a computer needs both primary **and** secondary storage.

.....

.....

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..... **[2]**

(ii) Give **one** example of a secondary storage device that the artist's computer will have **and** an example of the data that will be stored on it.

Secondary storage device .....

Example data .....

.....

[2]

(iii) The computer has Virtual Memory (VM).

The table has four statements about VM. Not all of the statements are correct.

Tick (✓) the **True** column for the statements that are correct.

Re-write any statement that is incorrect in the **False** column by changing the statement to make it true.

Statement	True (✓)	False – rewrite the statement to make it true
A section of primary storage is partitioned to act as virtual memory		
Data from ROM is transferred into VM		
VM is needed when RAM is full, or nearly full		
Data from VM is transferred back to secondary storage when needed		

[4]

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(b) The computer has an operating system and utility software.

State the need for utility software in a computer.

.....

..... **[1]**

(c) The artist uploads images to be displayed on a website. This is a client-server relationship.

(i) Identify the computer that is acting as the client in this scenario **and** justify your choice.

Client computer .....

Justification .....

.....

.....

.....

[3]

(ii) Identify the computer that is acting as the server in this scenario **and** justify your choice.

Server computer .....

Justification .....

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.....

.....

[3]

(d) The artist is working with a programmer on the development of a new piece of software.

The software will allow users to edit images on devices such as mobile telephones.

They are considering releasing the software as open source instead of proprietary.

(i) Describe **two** benefits to the artist and programmer of releasing the software as proprietary.

1 .....

.....

.....

.....

2 .....

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[4]

(ii) Describe **one** benefit to the users of releasing the software as open source.

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..... **[2]**

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7 A car has a 'Follow Me' system that uses a cruise control feature to allow the car to follow the car in front of it. It will keep the same speed and distance without the driver's intervention. The cruise control system is an example of an embedded system.

(a) Explain the reasons why the 'Follow Me' system is an example of an embedded system.

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..... **[3]**

(b) The car's system has Read Only Memory (ROM) and Random Access Memory (RAM).

(i) State **two** items that will be stored in the ROM for the 'Follow Me' system.

1 .....

2 .....

[2]

(ii) The RAM will store currently running data and instructions.

State **three** items of data that will be stored in the RAM for the 'Follow Me' system.

1 .....

2 .....

3 .....

[3]

(iii) Explain why the 'Follow Me' system does not need virtual memory.

.....

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..... **[2]**

EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.

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