

Name:

Class Teacher:

Date:



OCR J276

GCSE Computer Science

REVISION BOOKLET – MARK SCHEME

1.1 SYSTEMS ARCHITECTURE

Content in J276 GCSE Computer Science:

- 1.1 Systems Architecture
- 1.2 Memory
- 1.3 Storage
- 1.4 Wireless and Wired Networks
- 1.5 Network Topologies, Protocols and Layers
- 1.6 System Security
- 1.7 Systems Software
- 1.8 Ethical, Legal, Cultural and Environmental Concerns
- 2.1 Algorithms
- 2.2 Programming Techniques
- 2.3 Producing Robust Programs
- 2.4 Computational Logic
- 2.5 Translators and Facilities of Languages
- 2.6 Data Representation

EXAM QUESTIONS

QUESTION 1

Ann wants to purchase a new computer and is looking at two models. The specification of the CPU in each computer is shown below.

Fig. 1

Computer 1	Computer 2
Clock Speed: 1 GHz	Clock Speed: 1.4 GHz
Cache size: 2 MB	Cache size: 2 MB
Number of Cores: 4	Number of Cores: 2

When running a 3D flight simulator, Computer 1 is likely to run faster than Computer 2. Using the information above, identify **one** reason for this.

1	a		It has more cores.	1	<p>Although Computer 1 has a lower clock speed than the CPU in Computer 2 it has more cores, which means that it can be faster than Computer 2.</p> <p>Any answer relating to splitting a program into processes that be carried out consecutively will be accepted.</p>
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Explain **one** reason why the cache size affects the performance of the CPU.

	b		<ul style="list-style-type: none"> • data is transferred faster (1)... • ...which makes a CPU more efficient (1) • It is faster to transfer to and from cache (1)... • ...than transferring to and from RAM (1). 	2	<p>1 mark to be awarded for each correct identification and 1 mark to be awarded for the associated explanation to a maximum of 2 marks.</p>
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Identify **four** events that take place during the fetch-execute cycle.

	c		<ul style="list-style-type: none"> • An instruction is fetched from memory • The instruction is then decoded • The decoded instruction is then executed so that the CPU performs continuously • The process is repeated • The program counter is incremented • The instruction is transferred to the MDR • The address of the instruction to be fetched is placed in the MAR 	4	<p>1 mark is to be awarded for each correct answer to a maximum of 4 marks.</p>
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QUESTION 2

Gareth has a satellite navigation system (Sat Nav) which contains an embedded system. Define what is meant by an 'embedded system'.

2	a	<ul style="list-style-type: none"> A computer system that is built into another device 	1	
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Identify **three** devices, other than a Satellite Navigation system, that contain embedded systems.

	b	<p>Three devices from:</p> <ul style="list-style-type: none"> Dishwasher MP3 player Washing machine Mobile phone Manufacturing equipment 	3	<p>1 mark to be awarded for each correct example identified to a maximum of 3 marks.</p> <p>There are many other examples of devices with embedded systems which may be acceptable.</p>
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QUESTION 3

Here are some statements about the CPU of a computer. Tick **one** box in each row to show whether each of the following statements is true or false.

3				Statement	True	False	
				CPU stands for Central Processing Unit	?		
				The CPU fetches and decodes instructions	?		
				The speed of a CPU is usually measured in GigaHertz (GHz)	?		
				If a CPU has many cores, this slows down the computer		?	
				The hard disk drive is part of the CPU		?	
			<i>One mark per row</i>				
			5	<p>?Examiner's Comments??</p> <p>This question was generally well answered.</p>			

QUESTION 4

Dipesh is thinking of buying a tablet computer to replace his old desktop computer. Describe how the CPU and RAM work together to enable the tablet computer to operate.

4	a	<ul style="list-style-type: none">• Instructions / programs(currently running) / data are stored in the RAM...• these are fetched from the RAM by the CPU / Processor• ... where the instructions are executed / instructions are processed / data is processed	3	<p>If the candidate has described the functions of RAM and the CPU separately, only award the 2nd bullet if it is clearly stated that instructions are fetched from RAM.</p> <p>Mention of the fetch – execute cycle in the CPU is enough to award bullet 3.</p>
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The tablet computer also uses cache memory. Describe the purpose of cache memory.

	b	<ul style="list-style-type: none">• To store instructions / data that is frequently used / previously used / next to be used• Data does not need to be fetched from RAM• Speeds up access	2	
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QUESTION 5

Quinn's current computer specification is shown below.

1.5 GHz Dual Core Processor
 1GB RAM
 100GB Hard Drive
 64KB Cache
 Touchscreen
 Integrated camera and speakers
 2 × USB 3.0 ports
 2 × USB 2.0 ports
 Blu-ray drive
 2GB Graphics Card

Describe the benefits of a dual core processor over a single core processor.

5			<p>2 from</p> <ul style="list-style-type: none"> • Tasks can split between the processors... • ...tasks / processes / software / can be processed faster • ...more processes completed per second • Allows multitasking / Run more than one process / task / instruction / data at a time / per clock cycle... • ... tasks / processes / software / can be processed faster • ...more processes completed per second 	2	<p>MUST have given splitting tasks, or multi-tasking to allow speed</p> <p>Faster can only be given a mark if the first bullet(s) have been given.</p> <p>Examiner's Comments</p> <p>This question was answered fairly well, candidates were able to express that two processes could be carried out at once, and they then often got a second mark for identifying that this made it faster. Some candidates could not clearly express what was being processed, or simply stated that it was faster which was insufficient as the actual processes are not carried out faster, it is faster because it is completing two processes at the same time.</p>
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