Name:

Class Teacher:

Date:

OCR J276

GCSE Computer Science

REVISION BOOKLET

1.1 SYSTEMS ARCHITECTURE

Content in J276 GCSE Computer Science:

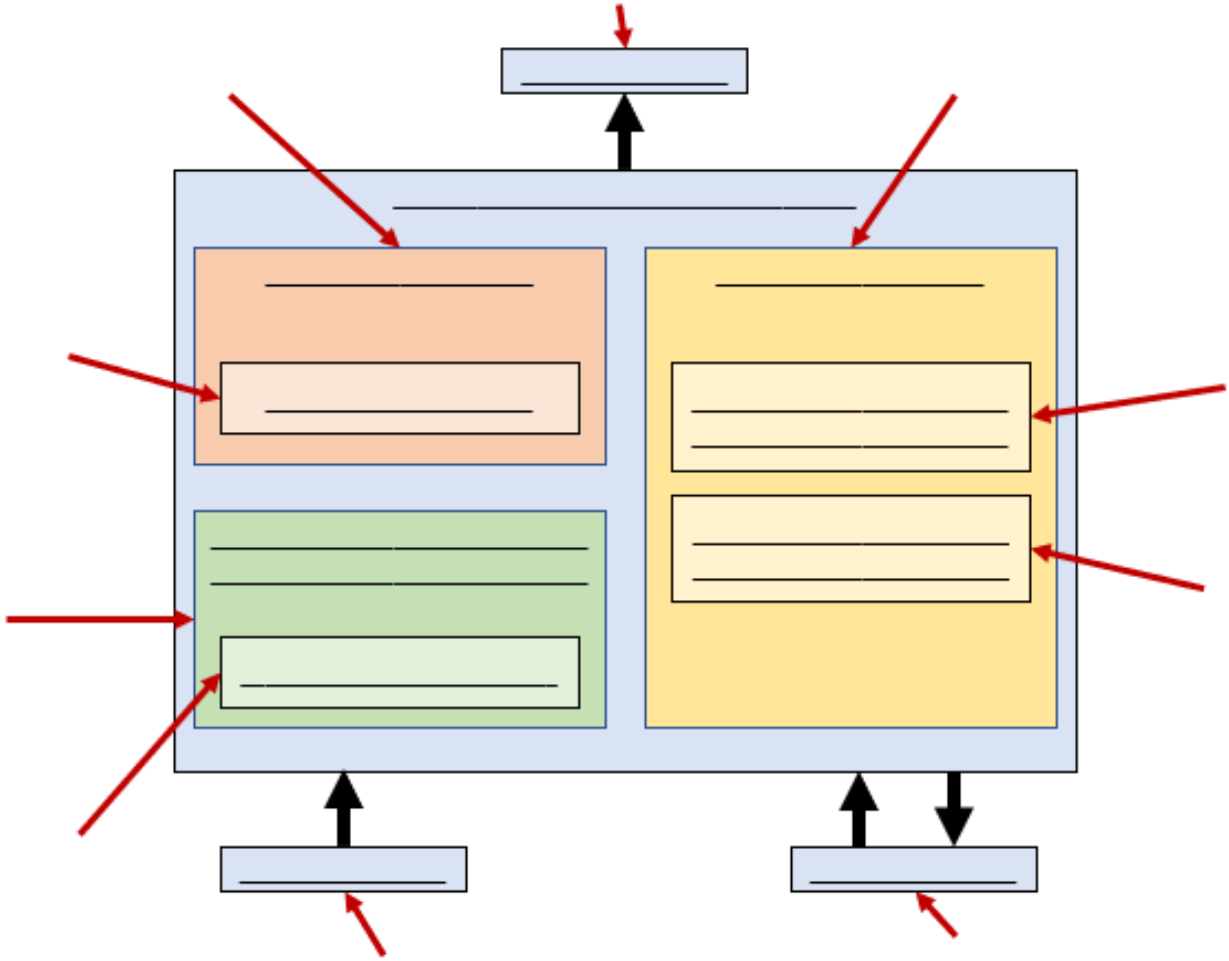
1.1 SYSTEMS ARCHITECTURE

TOPIC			
The purpose of the CPU			
Von Neumann Architecture:			
MAR (Memory Address Register)			
MDR (Memory Data Register)			
PC (Program Counter)			
ACC (Accumulator)			
Common CPU components and their function:			
ALU (Arithmetic Logic Unit)			
CU (Control Unit)			
Cache			
The function of the CPU as fetch and execute instructions stored in memory			
How common characteristics of CPUs affect their performance:			
Clock Speed			
Cache Size			
Number of Cores			
Embedded Systems:			
Purpose of Embedded Systems			
Examples of Embedded Systems			

1.1 SYSTEMS ARCHITECTURE

THE PURPOSE OF THE CPU

VON NEUMANN ARCHITECTURE



MAR (MEMORY ADDRESS REGISTER)

MDR (MEMORY DATA REGISTER)

PC (PROGRAM COUNTER)

ACC (ACCUMULATOR)

COMMON CPU COMPONENTS AND THEIR FUNCTION

ALU (ARITHMETIC LOGIC UNIT)

CU (CONTROL UNIT)

CACHE

FUNCTION OF THE CPU AS FETCH AND EXECUTE INSTRUCTIONS STORED IN MEMORY

HOW COMMON CHARACTERISTICS OF CPUs AFFECT THEIR PERFORMANCE

CLOCK SPEED

CACHE SIZE

NUMBER OF CORES

EMBEDDED SYSTEMS

PURPOSE OF EMBEDDED SYSTEMS

EXAMPLES OF EMBEDDED SYSTEMS

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.

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[1]

Explain **one** reason why the cache size affects the performance of the CPU.

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[2]

Identify **four** events that take place during the fetch-execute cycle.

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[4]

QUESTION 2

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

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[1]

Identify **three** devices, other than a Satellite Navigation system, that contain embedded systems.

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[3]

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.

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.		

[5]

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.

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[3]

The tablet computer also uses cache memory. Describe the purpose of cache memory.

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[2]

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.

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[2]