

6 (a) The processor uses several registers, including the Accumulator (ACC) and the Current Instruction Register (CIR).

Complete the table by describing the role of each register.

Register	Role
ACC	
	
CIR	
	

[2]

(b) Increasing the number of cores in a processor can affect the performance of a computer.

Describe the drawbacks of increasing the number of cores in a processor.

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[2]

(c) State **three** differences between Dynamic RAM (DRAM) and Static RAM (SRAM).

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[3]

1 (a) The table has six statements about the Von Neumann model for a computer system. Three of the statements are incorrect.

Statement number	Statement
1	The Program Counter (PC) stores the next instruction to be fetched from memory.
2	The Arithmetic and Logic Unit (ALU) performs mathematical and logical operations.
3	The Control Unit (CU) sends signals to other components on the data bus.
4	The Memory Data Register (MDR) transfers data to the memory address stored in the Memory Address Register (MAR).
5	The MAR stores an address from memory.
6	The Accumulator (ACC) stores the result of calculations.

Complete the table by writing the **three** incorrect statement numbers and the corrected statements.

Incorrect statement number	Corrected statement
	
	
	
	
	
	
	
	
	

[3]

- (b) Registers that are used in the Fetch-Execute (F-E) cycle include the PC, MAR, MDR and the ACC.

Identify **one** other register and describe its role in the Fetch-Execute (F-E) cycle.

Register

Role

[2]

- (c) Explain how an interrupt from an input device will be detected and handled in the F-E cycle.

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 [4]

- 2 A computer has a processor.

- (a) The processor has a Control Unit (CU) and system clock.

- (i) Explain how the CU and the system clock work together.

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 [2]

- (ii) The processor runs the Fetch-Execute (F-E) cycle.

Write the stages of the F-E cycle using register transfer notation.

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 [4]

- (b) The computer has cache memory.

Describe **one** benefit of the computer using cache memory.

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 [2]

- (c) The computer connects to a monitor using a High Definition Multimedia Interface (HDMI) cable that connects into an HDMI port.

Explain how HDMI provides connection to peripheral devices.

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 [2]

3 A computer system has a dual-core Central Processing Unit (CPU).

(a) State the purpose of the system clock and the Control Unit (CU) in a CPU.

System clock

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CU

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[2]

(b) (i) The number of cores in the processor affects the performance of the computer system.

Identify **one other** feature of a processor that can affect the performance of a computer system **and** state why it affects the performance.

Feature

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Reason

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[2]

(ii) A solid state (flash) memory drive is automatically recognised by the computer when it is plugged into a port in the computer.

Identify an appropriate type of port to connect the solid state memory drive to the computer.

Explain how this port provides an automatic connection.

Port

Explanation

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[3]

(c) Identify **two** disadvantages of using Dynamic RAM (DRAM) instead of Static RAM (SRAM) in a computer system.

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[2]

(d) The computer system is used to store data received from a temperature sensor every five seconds. The data is stored on an optical disc using an optical disc reader/writer.

(i) Describe the principal operation of an optical disc reader/writer.

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(ii) The computer uses a buffer when writing data to the optical disc.

Explain the use of a buffer when writing data to the optical disc.

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8 A computer designed using the Von Neumann model for a computer system contains general purpose registers and special purpose registers.

(a) Describe the purpose of the Status Register (SR).

[2]

(b) Identify **two** differences between general purpose registers and special purpose registers.

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2

[2]

3 A student has a computer.

(a) The computer is designed using the Von Neumann model for a computer system.

Complete the table by describing the purpose of each of the given registers.

Register	Purpose
Program Counter (PC)	
Memory Address Register (MAR)	
Memory Data Register (MDR)	
Index Register (IX)	

[4]

- (b) The student needs to connect the computer to a monitor that has a screen resolution of 2560×1600 pixels. The monitor also has built-in speakers.

The computer has a Video Graphics Array (VGA) port and a High Definition Multimedia Interface (HDMI) port.

Explain the benefits of connecting the monitor to the computer using the HDMI port instead of the VGA port.

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- (c) The computer has an Operating System (OS). One of the key management tasks of the OS is process management.

Describe the process management tasks performed by an OS.

..... [4]