

# OCR A-Level Computer Science

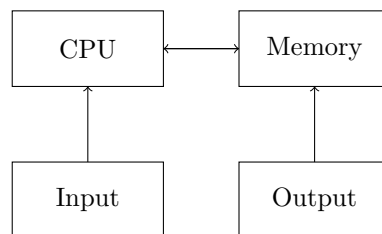
## H446 - Component 01

Topic 1.1: The characteristics of contemporary processors, input, output and storage devices

### Instructions

- Time allowed: 45 minutes
- Answer all questions
- The total mark for this paper is 50
- The marks for each question are shown in brackets [ ]
- Quality of extended responses will be assessed in questions marked with an asterisk (\*)

1. Define the term 'clock speed' and explain how it affects processor performance. [3 marks]
2. The diagram below shows a simplified version of the Von Neumann architecture.



- (a) Name the component that is missing from this diagram. [1 mark]
  - (b) Describe the role of this missing component. [2 marks]
3. Describe the Fetch-Decode-Execute cycle, explaining what happens at each stage. [6 marks]

4. A computer system has the following specifications:
- 3.2 GHz quad-core processor
  - 8 MB L3 cache
  - 16 GB DDR4 RAM
  - 512 GB SSD
  - 2 TB HDD
- (a) Identify two examples of volatile memory in this system. [2 marks]
- (b) Explain why having both an SSD and HDD might be beneficial. [4 marks]
- (c) Calculate how many instructions per second this processor could theoretically execute if each instruction takes 4 clock cycles. Show your working. [3 marks]
5. Compare and contrast CISC and RISC processor architectures. [5 marks]
6. \*Discuss the factors that affect the performance of contemporary processors and explain how manufacturers have addressed the physical limitations of increasing clock speed. [8 marks]
7. For each of the following scenarios, identify the most appropriate storage device and justify your choice:
- (a) A photographer needs to transfer 64 GB of high-resolution photos to a client. [2 marks]
- (b) A large corporation needs to archive 50 TB of financial records that must be kept for legal reasons but are rarely accessed. [2 marks]
- (c) A video editing workstation requires storage that allows for fast access to large video files. [2 marks]
8. Explain how the following input or output devices work, describing the technology they use:
- (a) Laser printer [3 marks]
- (b) Touchscreen [3 marks]
- (c) Barcode reader [2 marks]
9. A computer has a 64-bit processor.
- (a) Explain what is meant by a 64-bit processor. [2 marks]
- (b) Calculate the maximum amount of RAM that can be theoretically addressed by this processor. Show your working. [2 marks]

## Grade Boundaries

A*	A	B	C	D	E
45-50	40-44	35-39	30-34	25-29	20-24