Oxford Cambridge and RSA

A LEVEL

COMPUTER SCIENCE

H446/01 Computer Systems

Practice Paper - Section A: The characteristics of contemporary processors, input, output and storage devices

Time allowed: 45 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Write your answer to each question in the space provided.
- Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **NOT** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 40.
- This document consists of 8 pages.
- Quality of extended responses will be assessed in questions marked with an asterisk (*).

Candidate Name	Centre Number	Candidate Number	Date

GRADE BOUNDARIES

A*	A	B	C	D	E
36-40	31-35	26-30	21-25	16-20	11-15

Answer ALL questions

1. A computer system uses a processor with a 64-bit architecture.

   (a) Explain what is meant by a 64-bit processor architecture. [2 marks]

   (b) State two advantages of a 64-bit processor architecture compared to a 32-bit processor architecture. [2 marks]

   (c) Explain how the Arithmetic and Logic Unit (ALU) performs the logical operation XOR on two binary values. [3 marks]

2. The Fetch-Decode-Execute cycle is a fundamental process in the operation of a processor.

   (a) Describe the three stages of the Fetch-Decode-Execute cycle. [6 marks]

   (b) Explain the purpose of each of the following processor registers in the Fetch-Decode-Execute cycle: [4 marks]

   - Program Counter (PC)
   - Memory Address Register (MAR)
   - Memory Data Register (MDR)
   - Current Instruction Register (CIR)

3. A multi-core processor contains four separate cores on a single chip.

   (a) Explain what is meant by a multi-core processor. [2 marks]

   (b) Describe two advantages of using a multi-core processor rather than a single-core processor with a higher clock speed. [4 marks]

   (c) Explain how parallel processing can be implemented in a multi-core processor. [3 marks]

4. Modern computer systems use various types of secondary storage.

   (a) Compare the characteristics of Solid State Drives (SSDs) and Hard Disk Drives (HDDs) in terms of: [4 marks]
   - Speed
   - Physical durability
   - Power consumption
   - Cost per gigabyte

   (b) *Discuss the factors that would influence the choice of secondary storage devices for the following scenarios: [10 marks]
   - A video editing workstation that processes large 4K video files
   - A portable laptop used by a student for university work
   - A file server for a small business that needs to store large amounts of data economically

   In your answer, you should consider the characteristics of different storage technologies and how they match the requirements of each scenario.