MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF COMPUTING INFORMATION AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

TVET EXAMINATION

2023/2024 ACADEMIC YEAR

ONE YEAR FIRST SEMESTER EXAMINATION DIPLOMA IN COMPUTER SCIENCE

ICT/CU/CS/01/6/A – COMPUTER ARCHITECTURE & ORGANIZATION

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Answer all questions.

2. Mobile phones are not allowed in the examination room.

3. You are not allowed to write on this examination question paper.

QUESTION ONE (30 MARKS)

(a) Define computer organization and architecture. Briefly explain the relation between the two concepts in the context of computing. (4 marks)

(b) List and explain three categories of peripherals devices used in computer systems. (3 marks)

(c) What is cache memory and how does it improve computer performance? (3 marks)

(d) Describe the fetch-execute cycle in a Central Processing unit (CPU) (4 marks)

(e) Differentiate between volatile and non-volatile memory in computers. Give an example for each. (4 marks)

(f) What is the role of CPU? (2 marks)

(g) Explain the difference between programmed 1|0 and interrupt initiated 1/0 (3 marks)

(h) i. Explain the purpose of the bus in the computer architecture (2 marks)

ii. What is the significance of the fetch-execute cycle in CPU operations? (3 marks)

iii. Differentiate between RAM and ROM memory types in a computer system (3 marks)

(i) Explain how virtual memory improves system performance. (3 marks)

(j) i. Describe the role of registers in the CPU (3 marks)

ii. What is the role of the input-output controller in computer architecture? (3 marks)

QUESTION TWO (20 MARKS)

(a) Discuss computer memory organization in detail. Explain the functions and categories of internal memory. (10 marks)

(b) Compare and contrast solid-state storage devices, optical storage and magnetic storage devices (10 marks)

QUESTION THREE (20 MARKS)

(a) Explain the principles of computer organization and design. Discuss the basic components and functions of computer system. (10 marks)

(b) Give examples of how the components work together to execute instructions. (10 marks)

QUESTION FOUR (20 MARKS)

(a) Explain the difference between Binary, Octal, decimal and hexadecimal number systems and provide an example for each (10 marks)

(b) Convert the binary number 1011101 to its decimal and hexadecimal equivalent. (5 marks)

(c) Perform the addition of the binary number 1101 and 1011 (5 marks)