

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

RESITS/SPECIAL EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

COSC 0110: COMPUTER ARCHITECTURE

STREAMS: DIP COMP SCI Y1S1

TIME: 2 HOURS

DAY/DATE: TUESDAY 29/8/2023

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

- a) Answer question **ONE** and **TWO** other questions
- b) Do not write anything on the question paper
- c) This is a **closed book exam**, No reference materials are allowed in the examination room
- d) There will be **NO** use of mobile phones or any other unauthorized materials
- e) Write your answers legibly and use your time wisely.
- f) Marks are awarded for clear and concise answers.

SECTION A (Answer ALL questions in this section)

QUESTION ONE (30marks)

a) Define the following terms:

- i) Computer architecture. (2 marks)
- ii) Instruction set. (2 marks)
- iii) Volatile. (2 marks)
- iv) BIOS. (2 marks)
- v) Pipelining. (2 marks)

b) List TWO output devices and explain their role. (4 marks)

c) Explain the concept behind the following terms as used in ISA. (4 marks)

i. CISC

ii. RISC

d) State FOUR examples of secondary memory devices. (4 marks)

e) Using 3 inputs, draw a truth table for a NAND gate. (4 marks)

f) Draw symbols for AND and NOR gates. (4 marks)

SECTION B (Answer any TWO questions)

QUESTION TWO. (20marks)

- a) By use of Venn Diagrams explain the concept of the Hamming code in error detection and correction. (Hint; use the following data bits;1110). (10 marks)
- b) Explain steps of instruction execution in the CPU. (6 marks)
- c) State FOUR mnemonics examples of program transfer instructions which is an example of assembly instructions and give their meaning. (4 marks)

QUESTION THREE (20marks)

- a) Show by perfect induction that $A + \bar{A} \cdot B = A + B$. (10 marks)
- b) State and explain THREE types of errors that occurs during data transmission from the transmitter to the receiver. (6 marks)
- c) Describe the following file access modes (4 marks)
 - (i) a
 - (ii) r⁺

QUESTION FOUR (20marks)

- a) Using low level I/O, write a simple C program to create a file called test.txt in the read/write mode and write "hello world!" (6 marks)

- b) Error detection is the process of detecting the errors that are present in the data transmitted from transmitter to receiver, in a communication system.

State and explain FOUR types of error detection. (8 marks)

- c) State and explain THREE types of pipeline hazards. (6 marks)

QUESTION FIVE (20marks)

- a) Draw a diagram to illustrate the three main components of Von Neumann architecture and explain their functions. (8 marks)

- b) Explain THREE applications of microprogramming. (6 marks)

- c) Give THREE differences between SRAM and DRAM. (6 marks)

.....