



MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR SCIENCE (INFORMATION TECHNOLOGY)

SCO 104: COMPUTER ORGANIZATION AND ARCHITECTURE 1

DATE:

TIME:

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Define the following terms:
- (i) Memory (1 mark)
 - (ii) Cache (1 mark)
 - (iii) Computer Program (1 mark)
 - (iv) Machine Language (1 mark)
 - (v) Registers (1 mark)
- b) Distinguish between – adjust the question to CPU operations
- (i) RISC and CISC (2 marks)
 - (ii) Random and Sequential access (2 marks)
- c) With relevant examples distinguish between computer architecture and computer organization (4 marks)
- d) Using an illustration,
- i. describe the structure of CPU and
 - ii. explain the function of its components (8 marks)
- e) Briefly describe bus arbitration and explain two types of arbitration schemes. (5 marks)
- f) In regards to CPU performance distinguish between programed i/o and interrupt driven i/o (4 marks)

QUESTION TWO (20 MARKS)

- a) Describe how the magnetic disk is organized internally clearly illustrating your answer using diagrams (4 marks)
- b) Showing your working, Convert the binary number 110010101001111 to:
 - i. Octal (2 marks)
 - ii. Decimal (2 marks)
 - iii. Hexadecimal (2 marks)
- c) Explain **FOUR** cases which can result to generation of an interrupt during execution of a program. (8 marks)
- d) State two areas where Hexadecimal numbers are used and why (2 marks)

QUESTION THREE (20 MARKS)

- a) With the aid of a diagram
 - i. describe the steps taken in a single instruction cycle during processing (9 marks)
 - ii. Explain the hierarchical Bus Architecture found in a computer system (9 marks)
- b) Explain the over – flow rule (2 marks)

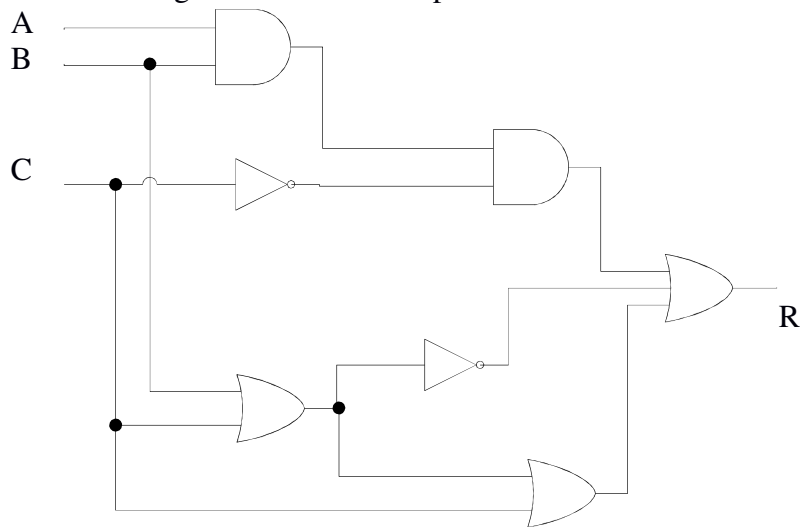
QUESTION FOUR (20 MARKS)

- a) When data is being sent to a printer an interrupt may occur. Define the term interrupt and state two reasons why an interrupt may occur in this case. (4 marks)
- b) Differentiate between machine language and high-level language (2 marks)
- c) With the aid of a diagram explain the Memory hierarchy in a computer System (8 marks)
- d) Explain the following memory concepts
 - i. Swapping (2 marks)
 - ii. Partitioning (2 marks)
 - iii. Paging (2 marks)

QUESTION FIVE (20 MARKS)

- a) A given computer system includes a hard disk with direct memory access (DMA). Suppose a user application needs to change a single byte within a disk block. Explain, in order all communications that must take place between the processor and the hard drive to complete this operation. (5 marks)

(6 marks)



(3 marks)

$$A'B'C' + A'B'C + ABC' + AB'C'$$

(3 marks)

(2 marks)