

# END TERM EXAMINATION

THIRD SEMESTER [BCA] DECEMBER 2024

Paper Code: BCA-203

Subject: Computer Organization and Architecture

Time: 3 Hours

Maximum Marks: 60

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

- Q1 Attempt **any five** of the following: (5x4=20)
- (a) What are the basic laws of Boolean algebra?
  - (b) Realize T type flip-flop using SR flip flop.
  - (c) Realize using NOR gate:  $Y = (A+C)(A+D')(A+B+C')$ .
  - (d) Explain General Register Organization with diagram.
  - (e) Using the block diagram explain the logic used in associative memory.
  - (f) Explain different methods of Asynchronous Data Transfer.
  - (g) Draw flowchart for interrupt cycle.

### UNIT-I

- Q2 What is the need of arithmetic circuit? Design and explain the logic diagram of a circuit for addition-subtraction. Use a control variable w and a circuit that functions as a full adder when w=0, as a full-subtractor when w=1. (10)

OR

- Q3 Using the K-map method, simplify the following Boolean functions and obtain: (10)
- (i) minimal SOP and(ii) minimal POS expressions:
  - a)  $Y = \sum_m(0,2,3,6,7) + \sum_d(8,10,11,15)$

### UNIT-II

- Q4 (a) What is an encoder? Discuss the design of octal to binary encoder. (5)  
(b) What is the major disadvantage of SR flip-flop? How is this addressed in JK flip-flop? (5)

OR

- Q5 (a) What is a flip-flop. List four basic flip-flop applications,  
(b) Explain the operation of master-slave flip-flop and show how the race around condition is eliminated in it. (5x2=10)

### UNIT-III

- Q6 (a) Draw a diagram of a bus system for four registers using three state buffers and a decoder instead of multiplexers. (5)  
(b) Explain shift Microoperations in detail. (5)

OR

- Q7 (a) Write a program to evaluate the arithmetic statement using a general register computer. (5)  
With **two address** instruction:  
 $X = A - B + C * (D * E - F) / G + H$   
(b) Draw and explain flowchart for memory reference instructions. (5)

### UNIT-IV

- Q8 Explain the following with diagram (**any two**):- (10)
- (a) Daisy-Chaining Priority
  - (b) Parallel Priority Interrupt
  - (c) DMA Controller

OR

- Q9 What is Mapping? Explain all three types of mapping procedure used in transformation of data from main memory to cache memory. (10)

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