

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)

ORQ3 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.
With **two address** instruction: (5)
 $X = A - B + C * (D * E - F) / G + H$
(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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