(Please write your Exam Roll No.) Exam Roll No.

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) $Y= \Sigma_m(0,2,3,6,7)+\Sigma_d(8,10,11,15)$

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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