

(Please write your Exam Roll No.)

Exam Roll No. 7

END TERM EXAMINATION

THIRD SEMESTER (BCA) JANUARY-FEBRUARY 2023

Paper Code: BCA-203

Subject: COMPUTER ORGANIZATION AND ARCHITECTURE

Time: 3 Hours

Maximum Marks: 75

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

- Q1. Attempt the following (any five) [5x5=25]
- (a) Why are NAND and NOR gates known as Universal Gates? Realize EX-OR function using only NAND gates. [6.5]
 - (b) Differentiate De-Multiplexer and decoder. [6]
 - (c) What is instruction cycle? Draw a flowchart for instruction cycle of a basic computer? [6]
 - (d) What is virtual memory and how does it work? [6]
 - (e) Explain the advantage of SIPO over SISO. Discuss their applications. [6]
 - (f) Design 4-bit Adder-Subtractor. [6]

UNIT-I

- Q2. (a) Draw K-Map and simplify the following expression: [6.5]
 $f(P, Q, R, S) = \sum m(0, 1, 4, 5, 7, 8, 9, 12, 13, 15)$
- (b) Design a full adder using two half adder and OR gate. [6]
- Q3. (a) Reduce the Boolean expression using Boolean laws. [6.5]
 $Y = AB + A'B + AB'(A+B)$ and also design using basic logic gates.
- (b) Design a 3-8 decoder using basic logic gates. [6]

UNIT-II

- Q4. (a) What is shortcoming in J-K flip flop? Explain how its shortcoming is removed. Describe its operating principle. [6.5]
- (b) Design 3-bit synchronous counter and draw output waveform. [6]
- Q5. (a) Describe the operation of 4-bit bidirectional shift register with the help of block diagram. [6.5]
- (b) Realize D type flip-flop using J-K flip flop. [6]

UNIT-III

- Q6. (a) Explain instruction formats and its types using the following expression: $X = (A+B) \cdot (C+D)$. [6.5]
- (b) What is register transfer language? Explain with the help of example. [6]

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- Q7. (a) Explain the different types of addressing modes in basic computer. [6.5]
- (b) What is meant by micro-operation? Explain the term selective set, selective complement, selective clear micro operation? [6]
- UNIT-IV
- Q8. (a) What is asynchronous data transfer? Explain different methods of asynchronous data transfer. [6.5]
- (b) What is DMA? Draw and explain the DMA controller in details. [6]
- Q9. Write short notes on the following: [12.5]
1. Cache Memory
 2. Auxiliary Memory
 3. Associative Memory
 4. EPROM
 5. RAM
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