



SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

SLOT: C1+TC1

Programme Name & Branch : B.Tech & CSE
Course Code and Course Name : Computation Structures, BACSE103
Class Number(s) : 7257/7259/7261/7263/7265/7269/7309
Date of Examination : 19.08.2025
Exam Duration : 90 minutes

General instruction(s):

Maximum Marks: 50

- Answer All Questions
- M- Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes
 1. To design and optimize minimal combinational circuits.
 2. To analyze and design sequential circuits utilizing various types of flip-flops.

Analyze and design sequential circuits utilizing various types of flip-flops.																								
Q. No	Question	M	CO	BL																				
1.	Using the basic concepts of number system conversion, complete the table with the appropriate values <table><tr><th>Binary</th><th>Octal</th><th>Decimal</th><th>Hexadecimal</th></tr><tr><td>$(110.111)_2$</td><td>6.142</td><td>6.875</td><td>6.006</td></tr><tr><td>110111.010</td><td>$(67.27)_8$</td><td>35.375</td><td>23.50E</td></tr><tr><td>10001.100</td><td>21.125</td><td>$(17.56)_{10}$</td><td>11.082</td></tr><tr><td>1101.000</td><td>15.053</td><td>13.085</td><td>$(D.16)_{16}$</td></tr></table>	Binary	Octal	Decimal	Hexadecimal	$(110.111)_2$	6.142	6.875	6.006	110111.010	$(67.27)_8$	35.375	23.50E	10001.100	21.125	$(17.56)_{10}$	11.082	1101.000	15.053	13.085	$(D.16)_{16}$	10	1	3
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2.	a) Draw the 4-variable Karnaugh map for the function $F(A, B, C, D) = \sum m(0, 2, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15)$. Derive the simplified Boolean expression. b) Design a vending machine that dispenses snacks based on a selection panel with four buttons: Chips, Soda, Candy, and Water. Each button corresponds to a specific item. When a user presses one button, the machine must send a binary code to the controller to identify the selected item. To reduce the number of wires between the selection panel and the machine controller, the selection must be transmitted using only 2 output lines.	6 4	1	3																				
3.	Design and explain a 4-bit Carry Look-Ahead Adder (CLA). You are given two 4-bit binary numbers: A = 1101, B = 0111, Initial Carry C ₀ =1. Find the final sum and carry with CLA.	10	1	3																				
4.	For the figure shown in Fig. 1, determine the final output X (Y ₃) for each combination using the functionality of the 4×1 MUX. Write the Boolean	10																						



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expression for the output X in terms of A, B, C, and D.

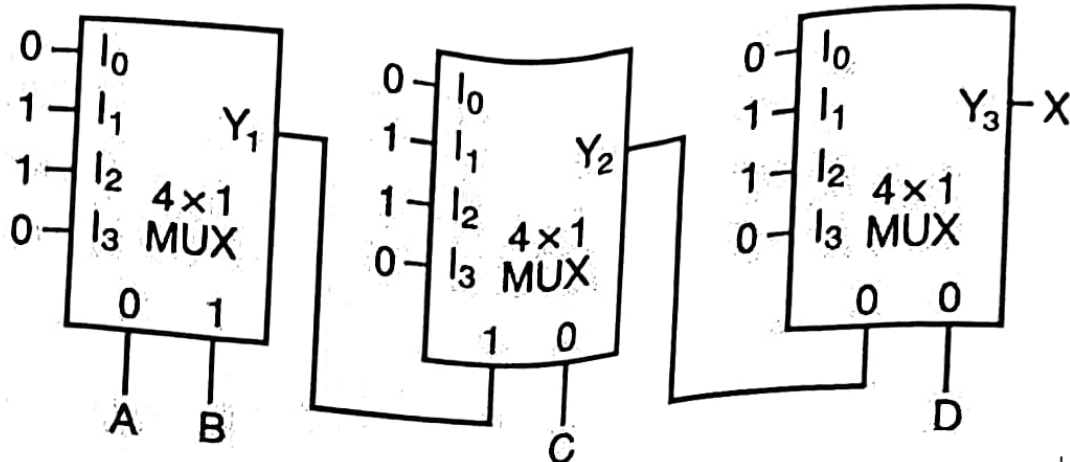


Fig. 1

5. Draw the logic symbols and truth tables for S-R, J-K, D, and T flip-flop. Explain the Race Around Condition in J-K flip-flop. Describe how the Master-Slave J-K Flip-Flop eliminates the Race Around problem. Include a basic timing explanation.

10

2

3