

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

SLOT: C2+TC2

Programme Name & Branch : B.Tech & CSE
Course Code and Course Name : BACSE103 & Computation Structures
Class Number(s) : 7247,7258,7260,7262,7310,7270,7264,7266.
Date of Examination :19.08.2025
Exam Duration : 90 minutes Maximum Marks: 50

General instruction(s):

- 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 Outcome Statements:
 - 1: To design and optimize minimal combinational circuits.
 - 2: To analyze and design sequential circuits utilizing various types of flip-flops.

Q. No	Question	M	CO	BL
1.	a) Convert the decimal number 365.625 to binary and hexadecimal.	5	1	3
	b) Convert the binary number $(1101011.101)_2$ to octal and decimal.	5	1	3
2.	a) Simplify the Boolean function: $F(A, B, C, D) = \Sigma(2,3,5,6,8,9,10,14)$ using a 4-variable Karnaugh Map. Draw the simplified circuit diagram using basic logic gates.	6	1	3
	b) Scenario: In a traffic control system, a 4×1 multiplexer is used to select one of four sensor signals (North, South, East, West). The select inputs are controlled by a microcontroller. Question: If select lines are $S_1=1, S_0=0$, which direction's sensor is currently being read? How does this setup help manage traffic efficiently?	4	1	3
3.	a) Define carry propagation and carry generation in adders. Explain how they are used in high-speed addition.	5	1	2
	b) Derive the expressions for the carry outputs C_1, C_2, C_3, C_4 of a 4-bit Carry Look-Ahead Adder and draw its logic diagram.	5	1	3
4.	a) Explain the working principles of a 4-to-2 binary encoder and a 3-to-8 decoder with neat logic diagrams and truth tables.	5	1	3
	b) Design a 16×1 multiplexer using two 8×1 multiplexer and one 2×1 multiplexer. Draw the block diagram and explain the selection logic.	5	1	3
5.	Explain the working of SR flip-flop and D flip-flop with neat logic diagrams and truth tables.	10	2	3