



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

Programme Name & Branch : B.Tech
 Course Code and Course Name: BCSE202L - Data Structures and Algorithms
 Faculty Name(s) : Common to all
 Class Number(s) : Common to all
 Date of Examination : 21/08/2025
 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 Outcomes: (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)
 CO. 1: Understand the fundamental analysis and time complexity for a given problem.
 CO. 2: Articulate linear, non-linear data structures and legal operations permitted on them.
 CO. 3: Identify and apply suitable algorithms for searching and sorting

Q. No	Question	M	CO	BL
1.	a) Describe the mathematical model behind algorithm analysis with neat sketch. (6 Marks) b) Find the time complexity of the given recurrence relation using recursion tree method. (4 Marks) $T(n)=3T(n/4)+n^2$	10	CO1	BL2
2.	a) Derive the time complexity of the following code with detailed analysis (5 Marks) <pre>for (i=0; i<n;i++) for(j=0;j<i;j++) sum+=i*j; for (k=0;k<n;k++) sum-=k; printf(" the value of sum is "+sum);</pre> b) Compute the time complexity of the following recurrence relation using master theorem. $T(n) = T(n/2) + n^4$ (5 Marks)	10	CO1	BL3
3.	a) Evaluate the postfix expression: 4 5 6 + * 9 - 7 / using stack with detailed step by step procedure. (5 Marks) b) Convert the following expression to post fix notation and show the content of stack in each iteration. $(A-B) + (C*D+E) / F$ (5 Marks)	10	CO2	BL3
4.	a) The following jobs are submitted to CPU; Jobs[A, B, C, D, E]. What is the result after completing Job.A? Write the procedure for dequeue operation. (3 Marks) b) Write the disadvantages of queue data structure using arrays, how to overcome with circular queue. Explain the insertion and deletion in circular queue with code snippet. (7 Marks)	10	CO2	BL3
5.	Write the pseudocode for Bubble Sort, sort the following data [29,13,22,37,5,18,9,25], display the list in each pass and derive the best and worst case time complexity.	10	CO3	BL4
