

Programme Name & Branch : BITE201L - Data Structures
 Course Code and Course Name : Mythili N, Tamil Priya D, Nancy Victor, Dharmitha
 Faculty Name(s) : VL2025260103036, 3040, 3029, 3025
 Class Number(s) : 18-Aug-2025
 Date of Examination : 90 minutes
 Exam Duration : Maximum Marks

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:

CO1: Identify user-defined data types, linear data structures for solving real-world problems.

problems.		M	CO						
Q. No	Question								
1.	(a) Differentiate static and dynamic data structures with examples and limitations. [5 Marks] (b) How the stack plays a major role in function calls. Elaborate with an example. [5 Marks]	10	CO						
2.	Let S represent an instance of the Stack ADT. Let S.push(x) push the value x onto the top of the stack, S.pop() remove the topmost element from the stack and return the value. Consider the following sequence of operations performed on S, which initially contains the value 55 as the top-most element (Assume that S is of sufficient capacity) S.push(7); S.push(20); S.push(35); S.pop(); S.push(14); S.pop(); S.pop(); What will be the element at the top of the stack after the above sequence of operations happens? Write the corresponding routines to perform the above operations.	10	CO1						
3.	a) Convert the following infix expression into prefix form using the following table format: <table border="1" style="width: 100%;"> <thead> <tr> <th>Current Symbol</th> <th>Operator Stack</th> <th>Postfix Expression</th> </tr> </thead> <tbody> <tr> <td colspan="3">(i) $(M * N) - X^Y * Z * (A + B - C / P * Q^R) / D$</td> </tr> </tbody> </table> b) Determine the value of the following postfix expression if the variables have the following values: A is 18, B is 3, C is 2, D is 13, E is 7, F is 5, and G is 2. (i) $AB / C^A DE + FG^A +$	Current Symbol	Operator Stack	Postfix Expression	(i) $(M * N) - X^Y * Z * (A + B - C / P * Q^R) / D$			10	CO1
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CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

SLOT: B1+TB1

4.	Let Q be an instance of a Queue ADT. Q.enqueue(x) adds an element x to the queue. Q.dequeue() performs a dequeue operation on the queue and returns the value that gets dequeued. Consider the following segment of code. <pre>Q.enqueue(1); int count=1; do { count=count+1; x = Q.dequeue(); Q.enqueue(2*x); Q.enqueue(4*x); } while (x!= 32);</pre> What will be the value of the variable count when the above segment of code completes its execution? Display the content of the Queue. Write the appropriate routines for the given code.	10	CO1	BL2
5.	You are tasked with building a patient record management system for a small clinic. The clinic wants to maintain a record of patients in the order they arrive. Propose a suitable dynamic data structure to implement this. (i) Add a new patient record to the system. (ii) Remove the most recently added patient record. (iii) Return the patient record present in the first position.	10	CO1	BL4
