CLASS: BTECH/IMSC   SEMESTER : III/ADD
BRANCH: CSE/AIML/MATHS   SESSION : MO/2024

SUBJECT: CS231 DATA STRUCTURES

TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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			CO	BL
Q.1(a)	'Polynomial time complexity is preferred over exponential time complexity'. Justify the correctness of above statement using suitable examples.	[2]	1	4
Q.1(b)	Show that $n^2/2 - 2n = \theta(n^2)$ and find the values of constants C1 and C2 and threshold n_o.	[3]	1	3
Q.2(a)	An array A contains n integers in non-decreasing order, $A[1] \leq A[2] \leq \cdots \leq A[n]$. Write a pseudo code of a linear time complexity to find i, j , such that A[i] + A[j] = a given integer M, if such i, j exist.	[2]	1	4
Q.2(b)	Write an algorithm to convert a given infix expression to postfix expression. Trace the steps involved in converting the following infix expression to postfix expression. $$A + B * (C^\wedge D - E)^\wedge(F + G * H) - I$$	[3]	1	3
Q.3(a)	What is Sparse Matrix? Explain that how an array can be used to implement it.	[2]	1	3
Q.3(b)	Write a pseudo code to check the balanced nesting of parentheses in an expression using Stack.	[3]	2	4
Q.4(a)	Convert the following infix expression into prefix expression $$K + L - M * N + (O \wedge P) * W / U / V * T + Q$$	[2]	2	3
Q.4(b)	Write algorithms using array for the following: a. Insertion of an element in a circular queue b. Deletion of an element from a circular queue	[3]	2	4
Q.5(a)	Explain a way to implement two queues in one single dimensional array.	[2]	2	4
Q.5(b)	Use suitable example to show that how the priority queues are implemented using array?	[3]	2	4

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