Amrita Vishwa Vidyapeetham

Amrita School of Engineering, Amaravati

B. Tech. Degree Examinations – January 2025

First Semester

CCE

23CCE101 Problem Solving and Algorithmic Thinking

Duration: Two hours

Maximum: 50 Marks

Course Outcomes (COs):

CO	Course Outcomes
CO01	Understand the concepts of computational logic.
CO02	Develop algorithmic thinking.
CO03	Identify algorithms and their suitability.
CO04	Apply algorithms to solve a problem.

Answer all questions

Q#	Questions	Marks	CO	BTL
1	a) Define an algorithm and explain at least four characteristics of an algorithm.	5	2	1
	b) Write an algorithm to sort an array using the selection sort technique.	5	2	2
2	Explain the concept of recursion and draw a flowchart to calculate the sum of the factorials of the first n natural numbers using the recursion technique.	10	4	3
3	a) How will you analyze the efficiency of an algorithm?	2	1	2
	b) Explain the concept of modularization?	2	1	1
	c) Write a pseudocode to evaluate if a number is divisible by both 3 and 5 using Boolean operators.	2	1	2
	d) How does time complexity differ between linear search and binary search?	2	2	2
	e) Evaluate the following Boolean expression for A = True , B = False , C = True: (A && B) || (B || C)	2	1	2
4	Define code tracing and explain its purpose. Also, illustrate code tracing using the binary search technique (BST) (Include the pseudocode of BST).	10	3	4
5	a) Write the required pseudocode and then draw a flowchart to print the following pattern up to given number N. Ex: Input : N=4. Output: 1 2 3 4 5 6 7 8 9 10	5	4	3
	b) Write an algorithm to calculate the sum of an array and analyze its time complexity.	5	3	4

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Course Outcome /Bloom's Taxonomy Level (BTL) Mark Distribution Table

CO	Marks	BTL	Marks
CO01	**8**	BTL 1	**7**
CO02	**12**	BTL 2	**13**
CO03	**15**	BTL 3	**15**
CO04	**15**	BTL 4	**15**

Bloom's Taxonomy Levels (attached for reference)

Level 1 – Remember

Level 2 - Understand

Level 3 – Apply

Level 4 - Analyze