

B.N.M. Institute of Technology

An Autonomous Institution under VTU

Department of Information Science & Engineering

Continuous Internal Assessment - I

Sem: IV

Sub: Design and Analysis of Algorithms

Sub code: 22ISE144

Date: 29/05/2024

Time: 11:15-12:30PM

Max Marks: 30

Note: Answer FOUR full questions selecting one full question from each part.

Marks	COs	POs/PSOs	Bloom's Cognitive Levels
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PART A

1	List and Identify the fundamental properties of algorithmic problem solving.	7	CO1	PO1, PSO1	Analyze
(OR)					
2	Categorize the Big-Oh and Big-Theta Asymptotic Notations.	7	CO1	PO1, PSO1	Analyze

PART B

3	Construct a Bubble sort algorithm to sort a list of elements using Brute force technique and build the time complexity for Selection sort.	8	CO2	PO1, PO3, PSO1	Apply
(OR)					
4	Build a Binary search algorithm to search a given key element using Divide and Conquer technique and outline the time complexity using substitution method.	8	CO2	PO1, PO3, PSO1	Apply

PART C

5	<div>Develop a Quick Sort Algorithm. Solve for the below given list of elements using quick sort.</div> <div><table><tr><td>6</td><td>10</td><td>4</td><td>3</td><td>9</td><td>2</td><td>1</td><td>5</td></tr></table></div>	6	10	4	3	9	2	1	5	7	CO2	PO1, PO3, PSO1	Apply
6	10	4	3	9	2	1	5						
(OR)													
6	<div>Apply the DFS-based algorithm to solve the topological sorting problem for the following digraphs</div> <div><div><p>(a)</p></div><div><p>(b)</p></div></div>	7	CO2	PO1, PO3, PSO1	Apply								

PART D

7	Solve the following knapsack problem using greedy method. $M = 40$, $n = 4$, $\{w_1, w_2, w_3, w_4\} = \{20, 25, 10, 15\}$ represents weights of 4 objects, $\{p_1, p_2, p_3, p_4\} = \{30, 40, 35, 10\}$ represents profits of 4 objects.	8	CO3	PO1, PO2, PO3, PO4, PSO1	Apply
(OR)					
8	Solve the following knapsack problem using greedy method. $M = 50$, $n = 4$, $\{w_1, w_2, w_3, w_4\} = \{25, 18, 12, 15\}$ represents weights of 4 objects, $\{p_1, p_2, p_3, p_4\} = \{40, 30, 55, 20\}$ represents profits of 4 objects.	8	CO3	PO1, PO2, PO3, PO4, PSO1	Apply

CO1: Apply and Analyze the asymptotic runtime complexity of algorithms by using mathematical relations that helps to identify them in specific instances.

CO2: Apply and solve problems using brute force, divide and conquer techniques.

CO3: Apply various problem-solving methodologies such as greedy, decrease and conquer to solve a given problem