Vivekanand Education Society's Institute of Technology, Chembur, Mumbai,
Department Of Computer Engineering
Year 2024-25
MID TERM TEST

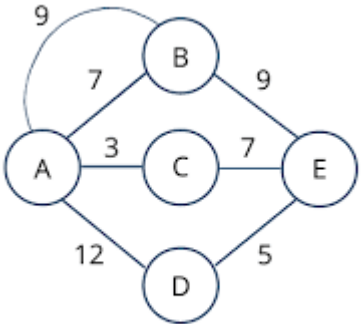
Class : Second Year (D7)	**Division: A/ B/ C**
Semester: IV	**Subject: Design and Analysis of Algorithm**
Date: 12th March 2025	**Time: 9:00 am**

CO	**CO1**	**CO2**	**CO3**
%	**45%**	**25%**	**30%**

Q.1		**(Attempt any five of the following.)**	**Marks (20)**	**CO**
	a	Apply Master Theorem to derive the time complexity for given recurrence relation : $T(n) = 3\ T(n/2) + n \quad n >= 1$	2	CO1

	b	Derive the Time Complexity of the given code snippet
		for (i = 0 ; i < n ; i++)
		for (j = 1 ; j < n ; j = j * 2)
		// statement
			2	CO1

	c	Apply Quick Sort upon the following elements considering the first element as the pivot. 4, 3, 8, 1, 7, 9	2	CO2
	d	Derive the Time complexity of Merge Sort using Recursive Tree method.	2	CO2
	e	Find the minimum and maximum of an array using Divide and Conquer Strategy for [2, 5, 8, 1, 9, 6].	2	CO2
	f	Explain Strassen's Matrix Multiplication Algorithm	2	CO2
Q.2	a	Explain Asymptotic notation with proper graphs and examples	5	CO1
		OR		
	b	Compare Insertion Sort with Selection Sort with respective the following parameters in a tabular format. 1. Time Complexity (Best case) 2. Time Complexity (Worst Case) 3. No. of Comparisons 4. Space Complexity 5. Adaptive (Efficiency in a nearly sorted data)	5	CO1

<table>
<tr><td>Q.3</td><td>a</td><td>Find the Minimum spanning tree using Prim's algorithm.
 
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<tr><td></td><td></td><td>OR</td><td></td><td></td></tr>
<tr><td></td><td>b</td><td>Fill the Knapsack (Capacity = 50) with the items given below. Mention the proportion of each item chosen
<table><tr><td>Profit</td><td>60</td><td>100</td><td>120</td></tr><tr><td>Weight</td><td>10</td><td>20</td><td>30</td></tr></table></td><td>5</td><td>CO3</td></tr>
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	a	Apply Master Theorem to derive the time complexity for given recurrence relation : T(n) = 3 T(n/2) + n n >= 1	2	CO1	BL3

	b	Derive the Time Complexity of the given code snippet
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	c	Apply Quick Sort upon the following elements considering the first element as the pivot. 4, 3, 8, 1, 7, 9	2	CO2	BL3
	d	Derive the Time complexity of Merge Sort using Recursive Tree method.	2	CO2	BL3
	e	Find the minimum and maximum of an array using Divide and Conquer Strategy for [2, 5, 8, 1, 9, 6].	2	CO2	BL3
	f	Explain Strassen's Matrix Multiplication Algorithm	2	CO2	BL2
Q.2	a	Explain Asymptotic notation with proper graphs and examples	5	CO1	BL2
		OR			
	b	Compare Insertion Sort with Selection Sort with respective the following parameters in a tabular format. 6. Time Complexity (Best case) 7. Time Complexity (Worst Case) 8. No. of Comparisons 9. Space Complexity 10. Adaptive (Efficiency in a nearly sorted data)	5	CO1	BL3

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 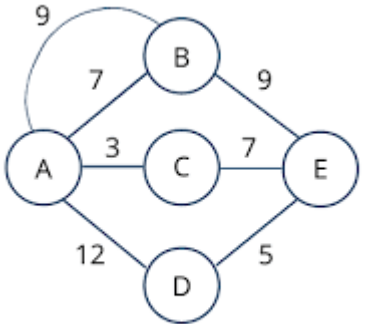
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