PVP 20

Code: 20ES1502

III B.Tech - I Semester – Regular / Supplementary Examinations
NOVEMBER 2024

DATA STRUCTURES AND ALGORITHMS
(ELECTRONICS & COMMUNICATION ENGINEERING)

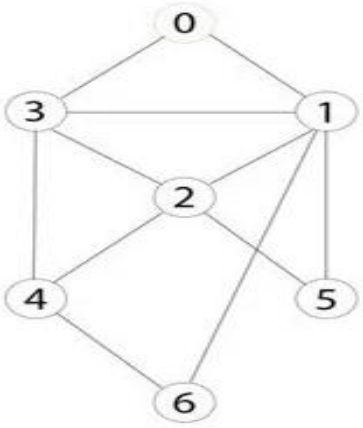
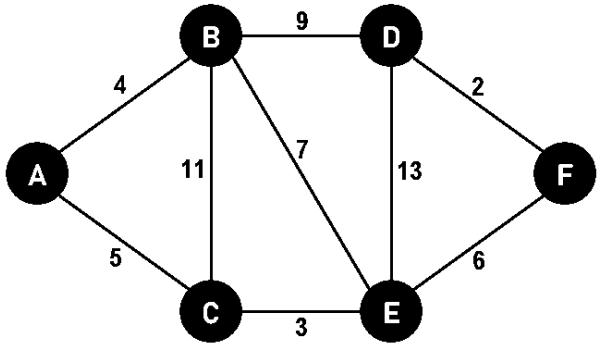
Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Explain the different operations that can be performed on a Doubly Linked List.	L1	CO1	7 M
	b)	Explain the Delete Operation in a Singly Linked List as compared to a Doubly Linked List with an example.	L1	CO1	7 M
OR					
2	a)	Explain the different operations that can be performed on a Singly Circular List.	L1	CO1	7 M
	b)	Elucidate the key differences between a Singly Linked List and a Singly Circular Linked List through an example.	L4	CO1	7 M
UNIT-II					
3	a)	What is a Queue? Give an application of a Queue and explain the different operations that can be done on a Queue.	L2	CO1	7 M

	b)	Discuss the Linked List based implementation of Stacks. What advantage does it hold over Array based implementation?	L3	CO2	7 M
OR					
4	a)	What are some common applications of stacks?	L2	CO1	6 M
	b)	Explain the concept of a circular queue and how it differs from a linear queue. Discuss its advantages and disadvantages.	L2	CO2	8 M
UNIT-III					
5	a)	Construct a Binary Search Tree for the following sequence of numbers in the given order: 55, 72, 22, 64, 90, 11, 40, 106, 65, 43, 71 and 29. Consider the first element (64) as the root node.	L4	CO1	8 M
	b)	From the resulting BST obtained in 5(a), delete the following elements one by one and draw the resulting BST after each deletion. The sequence of elements to be deleted are: 64, 72 and 11 in that order.	L3	CO2	6 M
OR					
6	a)	Explain In-Order, Pre-Order and Post-Order Traversal in Binary trees with appropriate examples.	L2	CO3	7 M
	b)	For the graph given in the figure below, apply the BFS traversal algorithm and output the appropriate tree Assume initial node has starting node.	L3	CO3	7 M

					
		UNIT-IV			
7	a)	Explain greedy algorithm with an any example.	L4	CO3	6 M
	b)	Apply the Dijkstra's algorithm to find the shortest path from node A to all other nodes, for the following graph. 	L3	CO3	8 M
		OR			
8	a)	Write an algorithm for the Quick Sort method and illustrate the algorithm for the sample input: 65, 24, 1, 45, 7, 12, 21, 30, 2	L4	CO4	7 M
	b)	Explain the Divide and conquer technique with a suitable example.	L3	CO4	7 M

UNIT-V					
9	a)	Explain travelling salesman problem by using the dynamic programming approach with an example.	L2	CO5	7 M
	b)	Explain 0/1 Knapsack problem using dynamic programming approach with an example.	L2	CO5	7 M
OR					
10	a)	Write an algorithm using the dynamic programming approach for the All-pairs shortest path problem.	L4	CO5	9 M
	b)	Discuss the time complexity of the algorithm that you have given in 10(a).	L2	CO5	5 M