PVP 20

Code: 20AM3303, 20DS3303

II B.Tech - I Semester – Regular Examinations
DECEMBER 2023

DATA STRUCTURES
(Common for AIML, DS)

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.

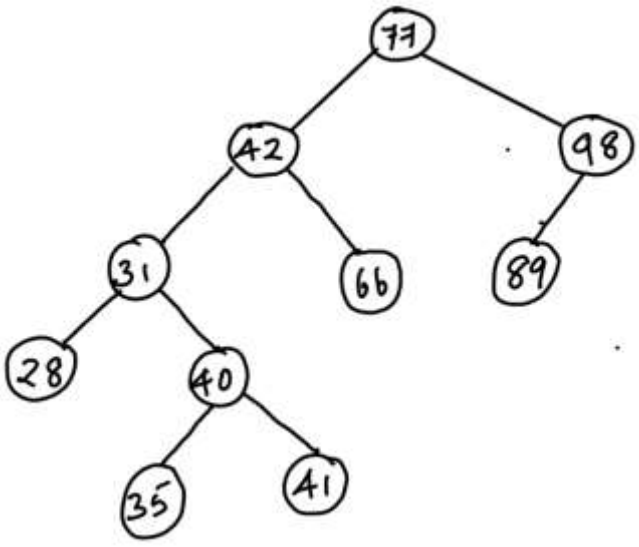
BL – Blooms Level CO – Course Outcome

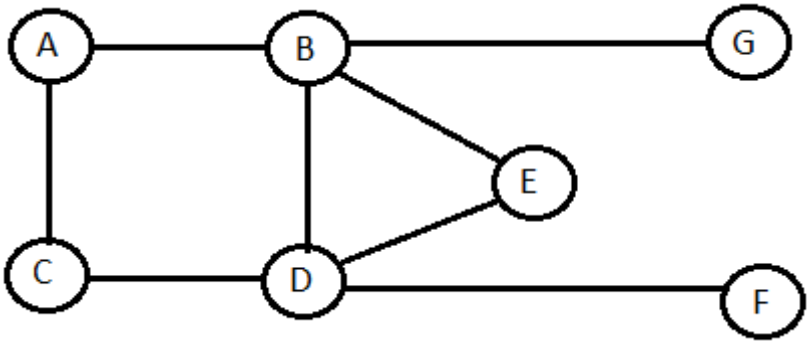
			BL	CO	Max. Marks
UNIT-I					
1	a)	What are the various ways in which data structures are classified and list the applications of those data structures.	L2	CO1	7 M
	b)	Illustrate the Bubble Sort algorithm on the following array of integers: 23, 6, 12, 15, 4, 1, 18, 3	L3	CO2	7 M
OR					

2	a)	Explain the Time complexity and space complexity of the below code.
		for (i=0; i<n; i++)
		for (j=0; j<m; j++)
		printf "PVPSIT"
			L3	CO1	7 M

	b)	Illustrate the Merge Sort algorithm on the following array of integers: 12, 0, 24, 68, 15, 24, 47, 6, 21	L3	CO2	7 M

UNIT-II					
3	a)	Given a singly linked list L (not necessarily in sorted order), write a procedure to delete a specific integer 'k' in L if it is present. If the element is not found print "not found". Illustrate the procedure with a suitable example.	L4	CO4	7 M
	b)	Explain how a Queue can be implemented as a singly linked list.	L3	CO3	7 M
OR					
4	a)	Explain the following operations on a doubly linked list with suitable examples: i) Deletion of a node at the end of the list. ii) Deletion of a node at a position k in the middle of the list. Assume that k is a value less than the length of the list.	L3	CO3	8 M
	b)	What is a Circular linked list? Explain the various operations that can be performed on a circular linked list with suitable example.	L3	CO3	6 M
UNIT-III					
5	a)	How can a Stack be implemented using Linked Lists. Give algorithms for Push and Pop operations.	L3	CO3	8 M
	b)	Convert the given in-fix expression to post-fix expression (A + B) * (C - D)	L3	CO3	6 M
OR					

6	a)	How can a Queue be implemented using Arrays? Give algorithms for Enqueue and De-Queue operations.	L3	CO3	7 M
	b)	Write the advantages of circular queues over normal queues. Explain the operations of circular queue with example.	L3	CO3	7 M
		UNIT-IV			
7	a)	Bring out the difference between a Binary tree and a binary search tree with suitable example of your own.	L2	CO1	6 M
	b)	Write and explain the traversal procedures of a binary tree with a suitable example.	L3	CO3	8 M
		OR			
8	a)	Define a BST and write the algorithm of insertion operation of an element 'k' into the BST with an example.	L3	CO3	6 M
	b)	For the given BST in the following figure, draw the resulting BST after the deletion of each of the following elements in the order: 42, 41 and 98. 	L4	CO4	8 M

UNIT-V					
9	a)	Write the DFS algorithm with a suitable example.	L3	CO3	8 M
	b)	Explain the representations of graph with suitable example.	L2	CO3	6 M
OR					
10	a)	Define the following with suitable examples: i) Directed Graphs ii) Bi-Connected components	L2	CO1	6 M
	b)	Write the BFS algorithm and find out the BFS sequence for the below graph. 	L3	CO3	8 M