

Reg. No.

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B.E./ B.TECH. DEGREE EXAMINATIONS, MAY 2023

Second-Semester

AD18202 – Data Structures and Algorithm Analysis

(Artificial Intelligence and Data Science)

(Regulation2018A)

TIME: 3 HOURS

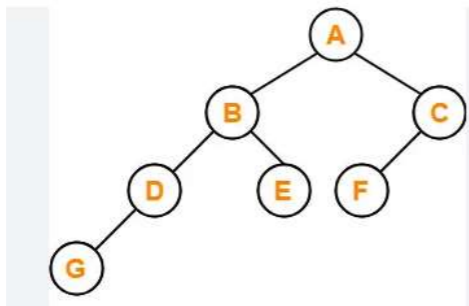
MAX. MARKS: 100

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	To be Familiar with the algorithm analysis techniques and orders of growth.	3
CO 2	To be Familiar with the linear data structures and its applications.	3
CO 3	To be Familiar with the tree data structures, hashing techniques and priority queues.	3
CO 4	To Understand graph algorithms and its applications.	4
CO 5	To Understand the various classes of algorithm design techniques.	4

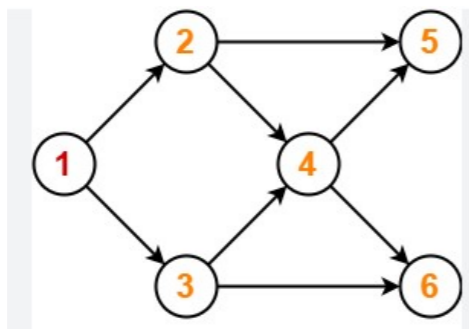
PART- A(10x2=20Marks)

(Answer all Questions)

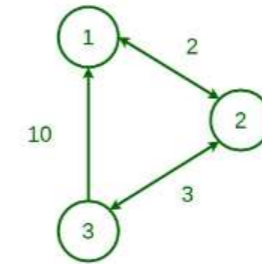
QUESTION	STATEMENT	CO	RBT LEVEL
1.	Define divide and Conquer strategy.	1	2
2.	List out different asymptotic notations.	1	2
3.	Differentiate between doubly linked list and circular linked list.	2	2
4.	Convert infix expression $2 * (4+3) - 5$ to postfix expression.	2	3
5.	Define binary heap.	3	2
6.	Write the balance factor for each node in the given tree.	3	2



7.	Give any 2 topological sorting for the given graph.	4	2
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8. Draw the minimum spanning tree for the following graph.



9.	State n-queens problem.	5	2
10.	Define optimal binary search tree.	5	2

PART- B (5x 14=70Marks)

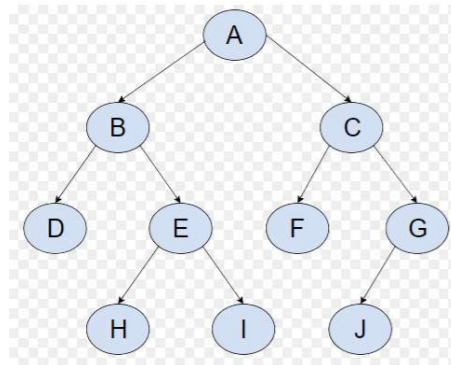
QUESTION	STATEMENT	Marks	CO	RBT LEVEL
11. (a)	(i) Write the pseudo code for Quick sort. Perform quick sort for the following numbers. 25,12,54,48,32,67,19,6,39,2.	(9)	1	3
	(ii) Write a short notes on solving recurrences.	(5)	1	2
	(OR)			
11. (b)	(i) Write the pseudo code for Merge sort. Perform Merge sort for the following numbers. 12,31,25,8,32,17,42,40,29,3.	(9)	1	3
	(ii) Write a short notes on analysis of recursive algorithms.	(5)	1	2
12. (a)	(i) Build stack St[] using Linked List mechanism and show push() , pop () , peek () ADT for the stack with node consisting key elements : St[]={ 20 , 30, 40 }	(8)	2	3
	(ii) Draw the stack structure in each case when the following operations are performed on an empty stack. (a) Add A, B, C, D, E, F (b) Delete two letters (c) Add G (d) Add H (e) Delete four letters (f) Add I	(6)	2	3
	(OR)			
12. (b)	(i) Write a program to show enqueue(), dequeue() for a linear queue of 10 input values.	(8)	2	3
	(ii) Convert the expression given below into its corresponding postfix expression and then evaluate it. Also write a program to evaluate a postfix expression. $10 + ((7 - 5) + 10)/2$	(6)	2	3
13. (a)	Consider the empty binary search tree. Now do the following operations: Insert 11, 22, 33, 44, 55, 66, and 77 in the tree.	(14)	3	3

Find the result of in-order, pre-order, and post-order traversals. Show the deletion of the root node and 55.

(OR)

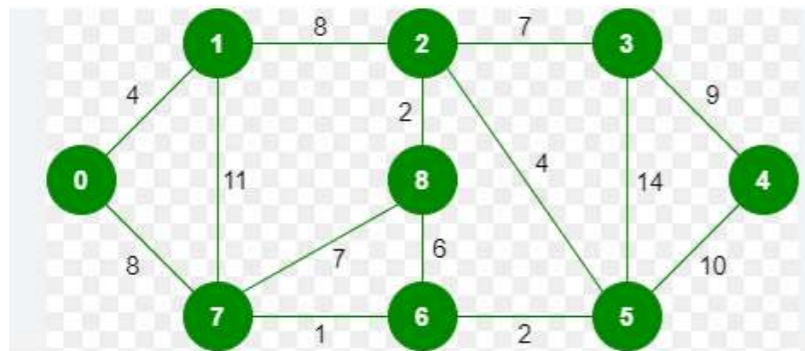
- (b) Define hashing. Explain in detail about the different types of hashing techniques with suitable example. (14) 3 3

14. (a) Explain in detail about Breadth First Search and Depth First Search. Write the BFS & DFS traversal for the following graph. (14) 4 3



(OR)

- (b) Explain in detail about kruskal's algorithm with a proper pseudocode. Solve the following graph using kruskal's algorithm. (14) 4 3



15. (a) Write the algorithm for assignment problem. Solve the following assignment problem. (14) 5 4

	Job 1	Job 2	Job 3	Job 4
A	9	2	7	8
B	6	4	3	7
C	5	8	1	8
D	7	6	9	4

(OR)

- (b) Write an algorithm for Huffman code. Find an optimal Huffman Code for the following set of frequencies: a: 50 b: 25 c: 15 d: 40 e: 75 (14) 5 4

PART- C(1x 10=10Marks)

(Q.No.16 is compulsory)

16. Write the pseudocode for the prim's algorithm. Find a minimum spanning tree for the given graph by considering A as a starting node using Prim's algorithm. (10) 4 5

