

Reg.No.:

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 60013

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024

Third Semester

Information Technology

U19IT303 - DATA STRUCTURES

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

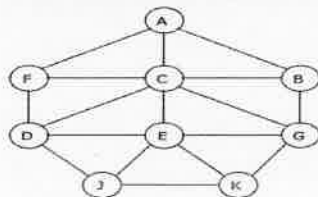
(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Outline the importance of using linked lists.	2	K2	CO1
2.	How can you insert a node to the beginning of a singly linked list and write its algorithm.	2	K2	CO1
3.	Define stack and list its operations.	2	K1	CO2
4.	Write the postfix form of the expression $A+B*(C-D)/(P-R)$?	2	K2	CO2
5.	Find how many passes are required to sort the elements 15,23,42, 64,11,24,51,33 using bubble sort.	2	K4	CO3
6.	List the methods for avoiding collision.	2	K2	CO3
7.	Show the result of inserting 3, 1, 4, 6, 9, 2, 5, 7 into an initially empty binary search tree.	2	K3	CO4
8.	Define the term strictly Binary tree.	2	K1	CO4
9.	Write any two applications of topological ordering.	2	K2	CO5
10.	What is the minimum number of spanning trees possible for a complete graph with n vertices?	2	K2	CO5

PART – B

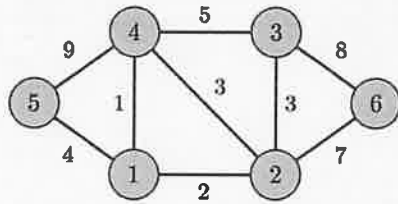
(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Assume that a doubly linked list is implemented with a header. Write a class that includes methods to:		K3	CO1
	i. Add a value 20 after the position.	5		
	ii. Remove a value 30 after the position 3.	5		
	iii. To check whether the list is empty.	3		
	(OR)			
b)	Explain how polynomial addition is done using linked list with the program segment.	13	K3	CO1
12. a)	i. Write an ADT to implement stack of size N using an array. The elements in the stack are to be integers. The operations to be supported are PUSH, POP and DISPLAY. Take into account the exceptions of stack overflow and stack underflow.	7	K3	CO2
	ii. Explain the array implementation of queue ADT in detail?	6		
	(OR)			
b)	What are Circular Queues? Write the procedure to insert an element to circular queue and delete an element from a circular queue using array implementation.	13	K2	CO2
13. a)	Illustrate the concept of bubble sort and selection sort with suitable example.	7+6	K2	CO3
	(OR)			
b)	Explain in detail about binary search with algorithm. Apply binary search the given element 77 in the given list 12,34,56,67, 77,78,89,92,99. Write the advantages and disadvantages of binary search.	13	K2	CO3
14. a)	Build the binary tree from the given traversal techniques:		K3	CO4
	i. Inorder: g d h b e i a f j c	7		
	Preorder: a b d g h e i c f j			
	ii. Inorder: g d h b e i a f j c	6		
	Postorder: g h d i e b j f c a			
	(OR)			
b)	Explain AVL tree with example.	13	K2	CO4
15. a)	Explain about breadth first search in detail. Find the BFS of below graph.	13	K2	CO5



(OR)

- b) Explain Prim's algorithm. Find the minimum spanning tree for the following using of the algorithm. 13 K3 CO5



PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Given input { 4371, 1323, 6173, 4199, 4344, 9679, 1989 } and a hash function $h(x)=x \text{ mod } 10$. Show the resulting. i. Separate chaining hash table ii. Open addressing hash table using linear probing iii. Open addressing hash table using quadratic probing iv. Open addressing hash table with second hash function	15	K3	CO3
(OR)				
b)	i. Explain list based implementation of stack. ii. Explain Dequeue and its operation in detail.	8 7	K3	CO2