Reg. No: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Question Paper Code:93802

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Third Semester

Information technology

19UIT302 -Data Structures and Algorithms

(Regulation 2019)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. In how many ways can you categorize data structures? And Explain   CO1- U

2. How array is represented in memory?   CO1- U

3. Consider the queue given below five Persons Already in Queue which has   CO2- App
   FRONT = 1 and REAR = 5.

	A	B	C	D	E				

   Show the queue after each operation of the following sequence
   i.   Enqueue(F)   ii. Dequeue   iii. Dequeue
   iv. Enqueue(G)   v. Enqueue(H)   vi. Dequeue

4. How stacks are used in a non-recursive program?   CO3- Ana

5. Which is the best data structure to implement AVL Tree? Array or Linked   CO3- Ana
   List. Justify.

6. How AVL is performing better than binary search tree?   CO3- Ana

7. Write some applications of graph.   CO1- U

8. Define in-degree and out-degree of a graph.   CO1- U

9. How does selection sort work?   CO1- U

10. Mention the different ways to select a pivot element.   CO1- U

PART – B(5 x 16= 80 Marks)

11. (a) Apply the concept of singly linked list to perform insertions and   CO2- App   (16)
        deletions in all cases

                                    Or

    (b) Apply the concept ofcircular linked list to perform insertions and   CO2- App   (16)
        deletions in all cases

12. (a) Write a program to perform Push and Pop operations on a stack   CO2- App   (16)
array

<div align="center">Or</div>

(b) A circular queue has a size of 5 and has 3 elements 10,20 and 40   CO2- App   (16)
where F=2 andR=4. After inserting 50 and 60, what is the value
of F and R. Trying to insert 30 atthis stage what happens? Delete
2 elements from the queue and insert 70, 80 &90. Show the
sequence of steps with necessary diagrams with the value of F &
R.

13. (a) Write an algorithm to create, insert and delete nodes in binary   CO2- App   (16)
tree.

<div align="center">Or</div>

(b) For the given data, draw a binary search tree and show the array   CO2- App   (16)
and linked representation of the same:
100,85,45,55,110,20,70,65.

14. (a) Define graph. For the given graph, show the adjacency matrix   CO2-App   (16)
and adjacency list representation of the graph.
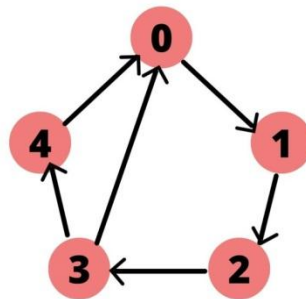
<div align="center">Or</div>

(b) Explain how Prim's algorithm is used for finding the minimum   CO2-App   (16)
spanning tree of agraph. Find a minimum cost spanning tree of
the following graph using Prim's algorithm

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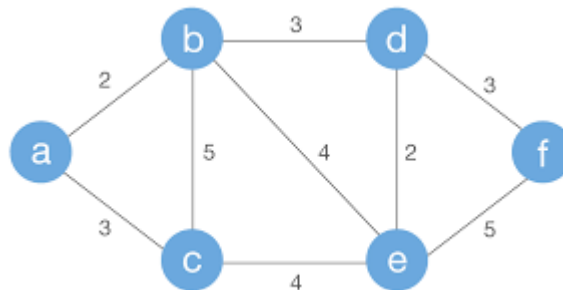
15. (a) Write a procedure for sorting a given list of elements using CO2-App   (16)
         Quick sort method. Show thedivision of the list in the quick sort
         for a list of 10 numbers 65,70,75,80,85,60,55,50,45,40

                                    Or

     (b) Explain Merge sort. Construct merge sort for the given list 42, CO2-App   (16)
         23, 74,11,65,58,94,36,99,87 using algorithm.

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