CHRIST (DEEMED TO BE UNIVERSITY),BENGALURU - 560029

End Semester Examination March/April - 2019

Master of Computer Applications II SEMESTER

Code: MCA232 **Max.Marks: 100**

Course: DATA STRUCTURES AND ALGORITHMS **Duration: 3Hrs**

SECTION A

Answer all the questions **5X20=100**

1 **a)** Compare linear and non-linear data structure with example. **(4)**

[OR]

2 **b)** Discuss the basic features of a ring buffer. **(6)**

3 **c)** Evaluate the following postfix expression using stack 5 9 3 + 4 2 * * 7 + *. **(10)**

[OR]

4 **a)** Describe the applications of stack in evaluating arithmetic expressions. **(4)**

5 **b)** Compare three different notations to represent arithmetic expression with an example. **(6)**

[OR]

6 **c)** Convert the following infix expressions to prefix and postfix form. **(10)**

(a) A + B / (C + B * C - D * (E – F / G))

(b) (J * H) * (L / M + N) * (P / (Q – R) * T)

7 **a)** Trace the steps of insertion sort to sort 12,19,33,26,29,35,22. Find the total number of comparisons made and analyse its time complexity. **(10)**

[OR]

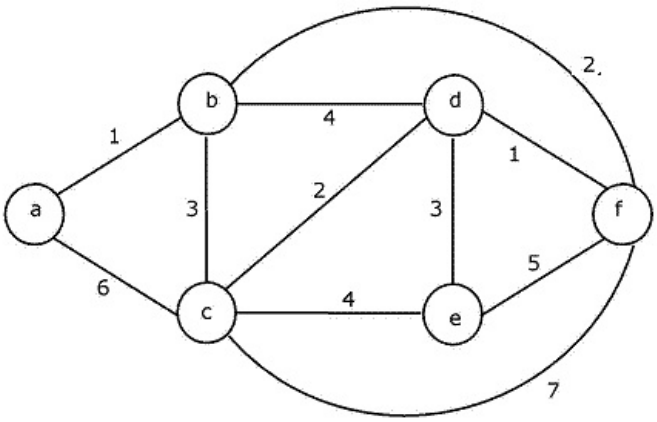
8 **b)** Compare linear search and binary search for the following set of elements: 1,2,3,9,11,13,17,25,57,90. **(10)**

9 **a)** Explain selection sort algorithm to sort the elements of the array in ascending order. **(10)**

[OR]

10 **b)** Explain how heap sort works to sort a set of elements in the worst case, best case and average case. **(10)**

11 **a)** Construct a minimum spanning tree for the following graph using Prim's algorithm. **(10)**

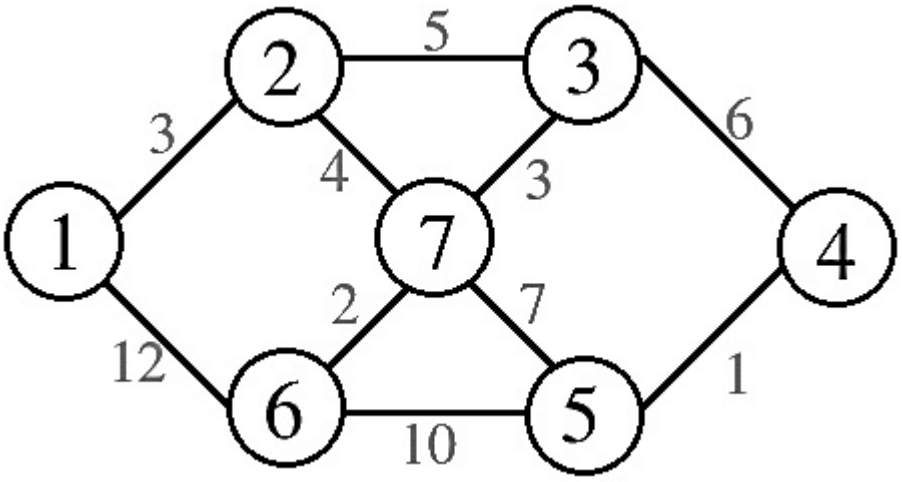


[OR]

12 **b)** Explain different types of imbalance and rotations of an AVL tree with an example. **(10)**

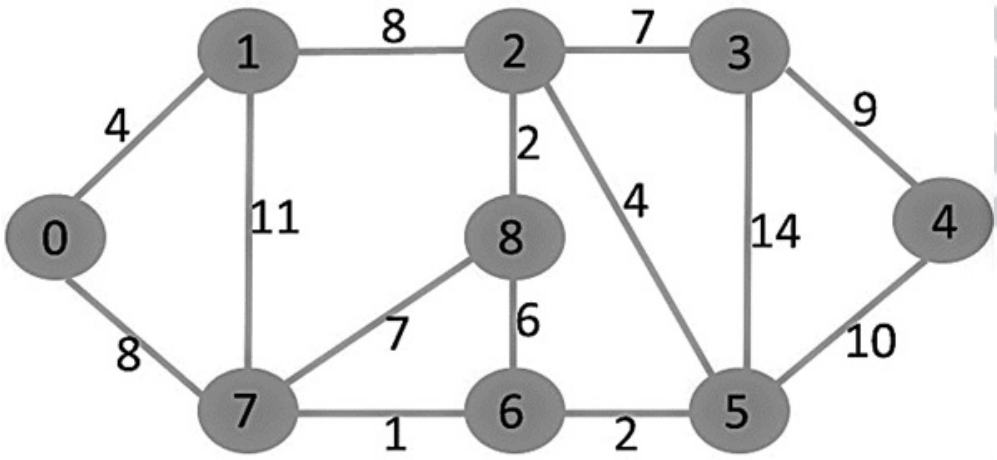
13 **a)** Calculate the adjacency matrix, adjacency list and degree of all the nodes for the following graph. **(10)**

END SEMESTER QUESTION PAPER



[OR]

14 b) Construct a minimum spanning tree for the following graph using Kruskal's algorithm. **(10)**



15 a) Discuss all pair shortest path algorithm with appropriate example. **(10)**

[OR]

16 b) Develop the pseudo code for general backtracking technique with an example. **(10)**

17 a) Explain travelling salesman problem using dynamic programming techniques with suitable example. **(10)**

[OR]

18 b) Discuss various steps to build a huffman tree for the following input array. **(10)**

character	Frequency
a	5
b	9
c	12
d	13
e	16
f	45

19 a) Justify Millennium Prize Problems are an unsolved problem. **(10)**

[OR]

20 b) Explain hard code generation for common sub expression with example. **(10)**

21 a) Compare the following NP complete decision problems: **(10)**

a) Unary Flow Show
b) Simple Max Cut
c) SAT2
d) Minimum cut into equal sized subsets
e) Simple optimal linear arrangement

[OR]

22 b) Explain non deterministic algorithm with suitable example. **(10)**