LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A. DEGREE EXAMINATION – **COMPUTER APPLICATIONS**

FIRST SEMESTER – **NOVEMBER 2019**

16/17/18PCA1MC04 – DATA STRUCTURES AND ALGORITHMS

Date: 01-11-2019   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

SECTION A

**Answer All Questions**   **(10X2=20)**

1. Why stack is considered as an abstract data type?

2. Write any two applications of stack.

3. What is the difference between binary tree and binary search tree?

4. What are AVL trees?

5. Define spanning tree.

6. What is completed graph?

7. What is external sorting? How it differs from internal sorting?

8. Define space complexity of algorithms.

9. Define Dynamic programming.

10. What is Branch and bound techniques?

SECTION B

Answer All Questions   **(8X5=40)**

11. a) Find the prefix and postfix notation of $(a+b) - (c*d) + e^{2/3*f}$

               (OR)

   b) Write an algorithm to add two polynomials.

12. a) Explain the tree traversal algorithms with example

               (OR)

   b) Write the insertion sort algorithm. Apply for the following data.

          14   9   16   5   2   18

13. a) Explain breadth first traversal algorithm with an example.

               (OR)

   b) Find the minimum cost spanning tree for the following using Prim's algorithm
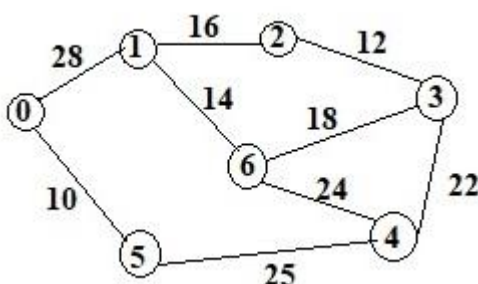
14. a) Explain Merge Sort with an example.

                    (OR)

   b) What is Knapsack problem? Write a greedy algorithm to solve it.

15. a) Explain 8- Queen's problem and the algorithm to resolve it.

                    (OR)

   b) What is travelling salesman problem? Solve it using branch and bound technique.

SECTION C

**Answer any two questions**   **(2X20=40)**

16. i) Explain the basic operations on doubly linked list.

   ii)Explain quick sort algorithm with an example

17. i) Discuss on Dijkstra's algorithm with an example
   ii) Explain Strassen's matrix multiplication algorithm.

18. i) Find the minimum spanning path in the following Graph from A and H. through forward approach and backward approach
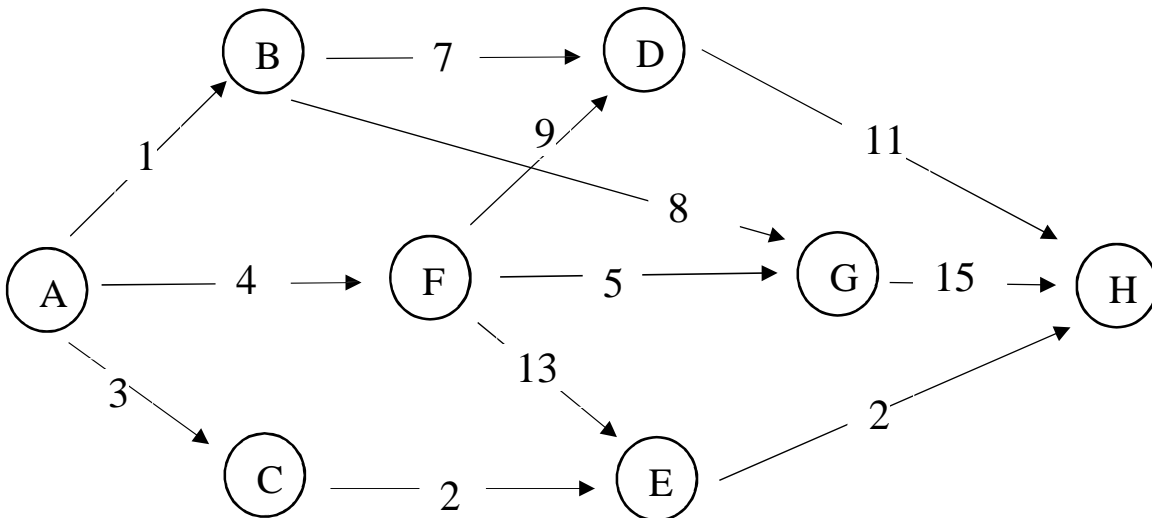
  ii) What are Red Black trees? Mention the insertion procedure in a Red Black tree.

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