

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

- 1 a) Construct a postfix expression from an infix expression $((A + B) * (C - E)) / (F + G)$. (4)

[OR]

- 2 b) Explain the linked list implementation of a queue. Write an algorithm to insert an item into the queue. (6)
- 3 c) Write a recursive algorithm for Towers of Hanoi and explain with an example assuming 4 disks. (10)

[OR]

- 4 a) Compare linear and non-linear data structure with example. (4)
- 5 b) List out the areas in which data structures are applied extensively. (6)

[OR]

- 6 c) Write an algorithm to implement stack operations using arrays (include: push(), pop(), isempty() and top()). (10)
- 7 a) Analyze linear search for the following unsorted numbers: (10)
11,2,9,13,57,25,17,1,90,3.

[OR]

- 8 b) Sort the following numbers using merge sort (trace the sorting): 80, 30, 60, 50, 40, 20, 70, 10. (10)
- 9 a) Analyze the time complexity of selection sort for the following unsorted list of elements. (10)

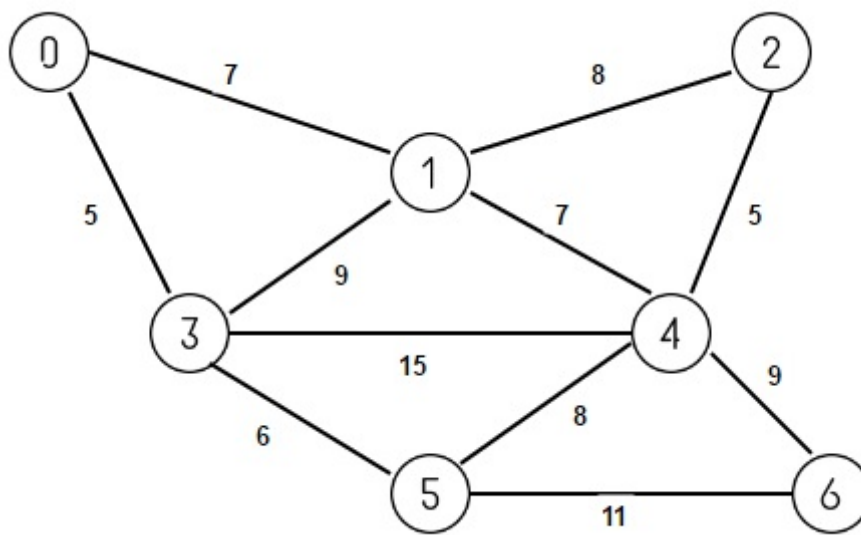
15	20	10	30	50	18	5	45
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[OR]

- 10 b) What is heap? Explain how heaps works to sort a set of elements. (10)
- 11 a) Explain the following with examples. (10)
- i. Strongly connected graph and weakly connected graph.
 - ii. Weighted directed graph and Undirected graph.
 - iii. Cyclic and acyclic graphs.
 - iv. Trees and Minimum Spanning trees.
 - v. Binary Search Tree and Binary Tree traversal.

[OR]

- 12 b) Trace the Depth First Search algorithm with suitable graph (10)
- 13 a) Find the minimum spanning tree for the following graph using Prim's algorithm. (10)



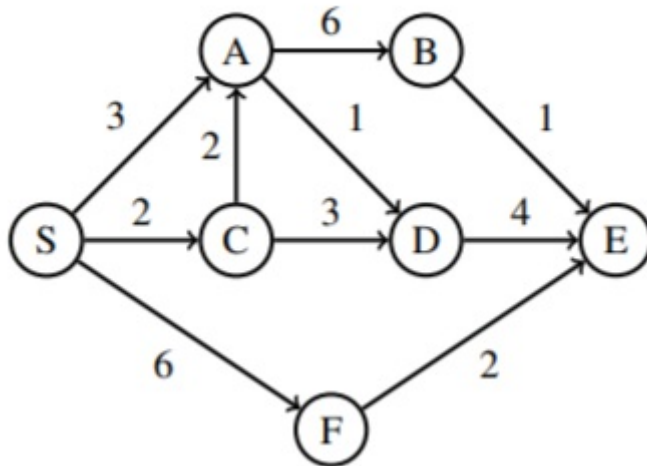
[OR]

14 b) Show the result of inserting 2,1,4,5,9,3,6,7 into an empty AVL tree. **(10)**

15 a) Discuss 8 Queen's problem by backtracking. **(10)**

[OR]

16 b) Find the shortest path from S to all other vertices for the following graph using Dijkstra's algorithm and display the shortest path. **(10)**



17 a) Analyse Floyd-Warshall algorithm for finding shortest paths in a weighted graph. **(10)**

[OR]

18 b) Write an algorithm to find the sum of subsets and analyze its time complexity. **(10)**

19 a) List out the difference between NP-Hard and NP-Complete problems with example. **(10)**

[OR]

20 b) Explain any two hard code generation problem with example. **(10)**

21 a) Examine the following statements and justify with example **(10)**

i. If a problem in NP can be solved in polynomial time then all problems in NP-Complete can also be solved in polynomial time.

ii. If a problem in NP-complete can be solved in polynomial time then all problems in NP can also be solved in polynomial time.

[OR]

22 b) Discuss any one NP Hard Scheduling problem in detail. **(10)**