(3 Hours)   [Marks: 80]

N.B.: 1) Question No. 1 is compulsory.
  2) Answer any three out of remaining questions.
  3) Assume suitable data if necessary.
  4) Figures to the right indicate full marks.

Q1. (a) Define Graph? Explain different types of graph.   (5)
  (b) Explain first fit, best fit and worst fit method with example.   (5)
  (c) Explain threaded binary tree.   (5)
  (d) Briefly explain memory fragmentation.   (5)
  (e) Differentiate between linear and nonlinear data structures.   (5)

Q2. (a) Design an algorithm to perform the following operations on stack: (10)
  i)   Push
  ii)   Pop
  iii)   Display

Q2. (b) Explain insertion sort by giving its algorithm and sort the following data using insertion sort.
                                                                                            (10)

                                38, 27, 43, 3, 9, 82, 10

Q3. (a) Convert the following expression into postfix expression using stack and write the algorithm
for the same   (10)
A/B-C+D*E-A*C

Q3. (b) Explain Priority Queue and variants of Priority Queue.   (10)

Q4. (a) Construct a minimum spanning tree for the graph shown in figure 1 using Kruskal's and Prim's
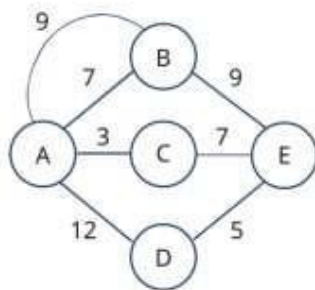Algorithm and find out the cost with all intermediate steps.   (10)

Figure 1: Graph

Q4. (b) Define AVL tree. Step by step construct an AVL tree for the following data: (10)
30,20,10,25,40,50,55,22,23

Q5. (a) Explain different hash functions. Assume a table has 11 slots (m=11). Using Quadratic probing, insert the following elements into the hash table. 36, 18, 72, 43, 6, 10, 5, and 15 are inserted in the order.
(10)

Q5. (b) Define Binary Search Tree. Construct the binary search tree from following traversal:

(10)

In-order: D B H E A I F J C G

Pre-order: A B D E H C F I J G

Determine the post-order of the tree drawn.

Q6. Solve any Four: (20)

a) Graph Traversal Algorithm
b) Game Tree
c) Radix Sort
d) B-tree
e) Round Robin Scheduling

****