

Total No. of Questions : 8]

SEAT No. :

**P1008**

**[4457]- 185**

[Total No. of Pages : 3

**S.E. (E & TC / Electronics)**

**DATA STRUCTURES & ALGORITHMS**

**(2012 Course) (204184) (Semester - II)**

*Time : 2 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4 and Q5 or Q6, Q7 or Q8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 4) *Assume suitable data, if necessary.*

**SECTION - I**

- Q1)** a) Write an algorithm for searching an element in a list of integers using binary search. Discuss the time complexity of algorithm in best case and worst case. [6]
- b) Explain with suitable examples, how do you pass structure variable to a function. [6]

OR

- Q2)** a) Write a function to sort the numbers in a list of integers using insertion sort. Discuss the time complexity of insertion sort algorithm in best case and worst case. [6]
- b) What is subalgorithm? What are its types? Write a subalgorithm to find n!. [6]

- Q3)** a) Write pseudocode to create a singly linked list of real numbers. [6]
- b) What is priority queue? What are various ways of implementing priority queue? Explain any one. [6]

OR

- Q4)** a) Explain following: [6]
- i) Garbage collection.
  - ii) Garbage compaction.
- b) Convert following expression into postfix format show all steps and stack contents. During every step.  $(a+(b*c/d)-e)$  [6]

**P.T.O.**

- Q5)** a) Explain with suitable example how will you represent a binary tree using array? [4]  
 b) Write psuedo-code to insert an element in a binary search tree implemented using linked representation. [5]  
 c) What is threaded binary tree? Create a threaded binary tree for following data. Which is BSF traversal of the tree. 10 20 30 40 50. [4]

OR

- Q6)** a) The preorder and inorder traversal of a tree are given below. Draw the binary tree. Show all steps. [4]  
 Inorder traversal : A B C D E  
 Preorder traversal : A B C D E  
 b) Create a binary search tree for following data. Show all steps. [5]  
 MAN, CAR, BAG, SUN, TAN.  
 c) What is AVL tree? Explain with suitable example the RR rotation & balance factor. [4]

- Q7)** a) Write a functions to implement DFS traversal of graph implemented using adjacency matrix. [5]  
 b) Using prim's algorithm find the minimum spanning of the graph given below. [4]

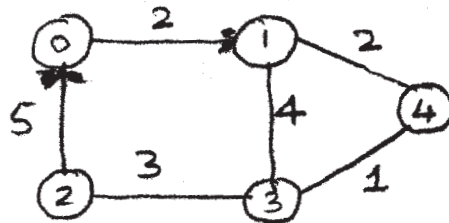


Fig Q.7 (b)

- c) Write topological sort for following graph. [4]

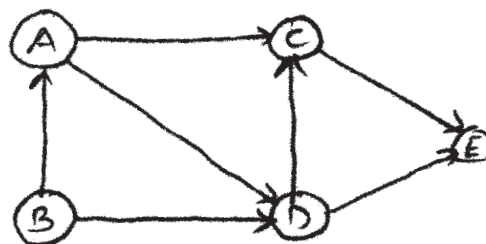


Fig Q.7.(c)

OR  
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- Q8)** a) Draw the adjacency list of the graph given in Fig. Q7). b) [4]
- b) Using Kruskal's algorithm find the minimum spanning tree of the graph given in Fig. Q7). b). [4]
- c) Write an algorithm to find indegree and outdegree of a vertex in a given graph. [5]

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