

[4457] - 117  
S.E. (Computer) (Semester - II)  
DATA STRUCTURES  
(2008 Course)

Time :3 Hours]

[Max. Marks :100

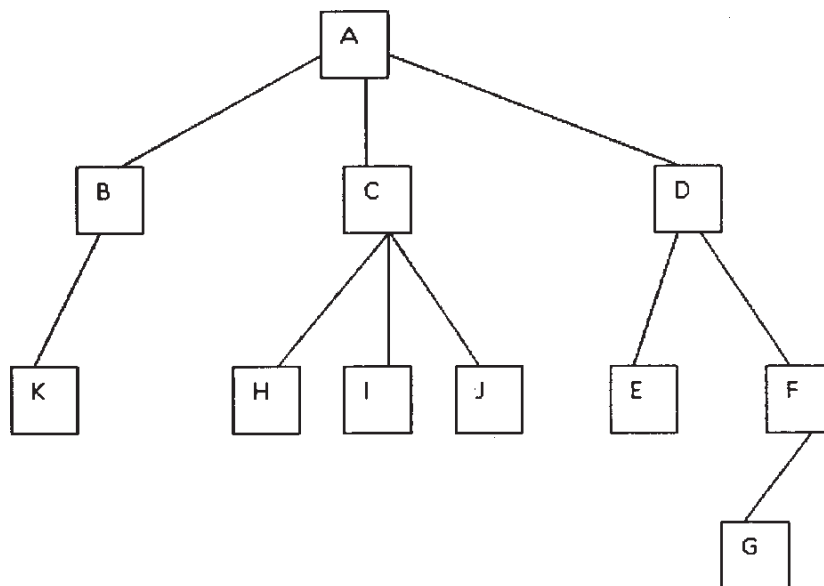
Instructions to the candidates:

- 1) Answer three questions from Section-I and three questions from Section-II.
- 2) Answers to the two sections should be written in separate answer books.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Figures to the right indicate full marks.
- 5) Assume suitable data, if necessary.

SECTION - I

Q1) a) Convert the following tree into a binary tree.

[6]

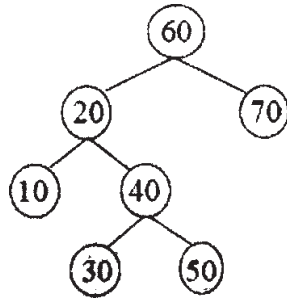


- b) Write a non-recursive pseudo C/C++ code to count the number of leaf nodes in a binary tree and to print them. [8]
- c) The postorder traversal of the Binary Search Tree is as follows: 70, 72, 75, 80, 85, 90. Draw the Binary Search Tree for the above data. [4]

OR

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**Q2)** a) Represent the following binary tree using array. **[4]**

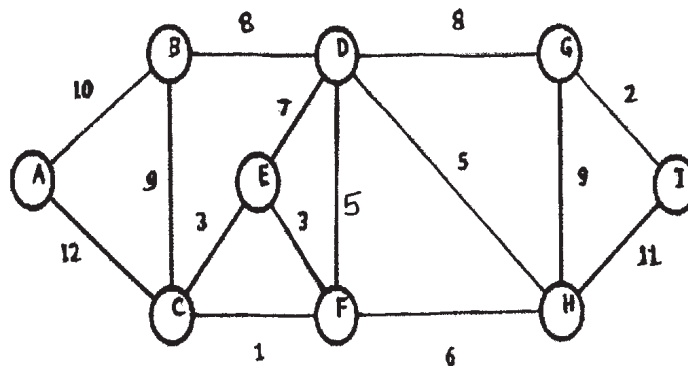


b) Write a pseudo C/C++ code to delete a node from a binary search tree. **[8]**

c) Write a pseudo C/C++ code to print the nodes with smallest and largest value in a binary search tree. **[6]**

**Q3)** a) Write a pseudo C/C++ code to display the depth first traversal of a graph. Explain the working of the code with suitable example. **[8]**

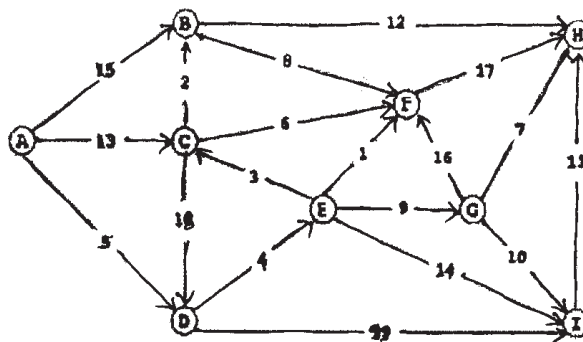
b) Find a minimum spanning tree for the following graph using Prim's Algorithm. Write the time complexity of the algorithm. **[8]**



OR

**Q4)** a) Write a pseudo C/C++ code to find print the topological sorting of the graph. Explain working of the code with suitable example. **[8]**

b) For the following graph, find out the shortest path between the vertices A and I using Dijkstra's shortest path algorithm. **[8]**



- Q5)** a) Explain the use of Huffman tree. State whether Huffman trees are static or dynamic trees. Generate the Huffman tree for the data 8, 9, 10, 11, 13, 15, 22. [8]
- b) What is hash function? Explain the different types of hash functions. [8]

OR

- Q6)** a) Write a pseudo C/C++ code to insert a node in an AVL tree. [8]
- b) Consider a hash table of size 10 and a hash function of  $X \bmod 10$ . Build the hash table using linear probing with and without replacement for the following data: 44, 25, 88, 09, 19, 35, 04, 22, 36, 01. [8]

### **SECTION - II**

- Q7)** a) Write a pseudo C/C++ code to arrange the numbers in descending order using heap sort. [8]
- b) Create a B tree of order 5 for the following data: [10]
- 1, 12, 8, 2, 25, 5, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55, 45,

OR

- Q8)** a) Write a pseudo C/C++ code to insert the node in B tree. [10]
- b) Sort the following data in ascending order using heap sort: 6, 5, 3, 1, 8, 7, 2, 4. [8]

- Q9)** a) What is index sequential file organization? State its advantages and disadvantages. [8]
- b) Write a pseudo C/C++ code to implement create, insert, delete, search operations on direct file organization. [8]

OR

- Q10)** a) Describe the following file operations with all options and examples: fseek(), ftell(), fopen(), fclose(). [8]
- b) Write a C/C++ program to create a file. Insert records in the file by opening file in append mode. Display all records and search for specific record entered by user. [8]

- Q11)** a) Write a C++ program using STL stack to reverse a given string and display the original and reversed string. [8]
- b) What is iterator and Container? List different types of iterators and explain each in brief. [8]

OR

- Q12)** a) Write a C++ program using STL vector to implement the following operations for student database: insert record, delete record, search record, sort records as per student roll number. [8]
- b) What is STL ? What are the components of STL ? Explain each in brief. [8]

