Total No. of Questions – [8] Total No. of Printed Pages 03

G.R. No.	

Paper Code - U228 - 143 (ESE)

MAY 2019/ENDSEM

S. Y. B. TECH. (INFORMATION TECHNOLOGY) (SEMESTER - II)

COURSE NAME: DATA STRUCTURES AND FILES

COURSE CODE: ITUA22173 (PATTERN 2017)

Time: [**2 Hours**] [Max. Marks: **50**]

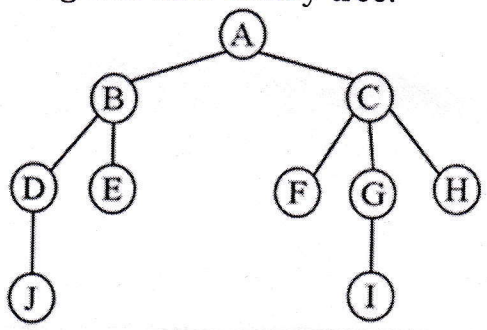
(*) Instructions to candidates:

1) **Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) a) Differentiate between Linear and Non-Linear Data Structures. Explain the concept of Threaded Binary tree. [6]

OR

b) Give the steps for converting a General tree into a Binary tree. Convert the following tree into binary tree. [6]

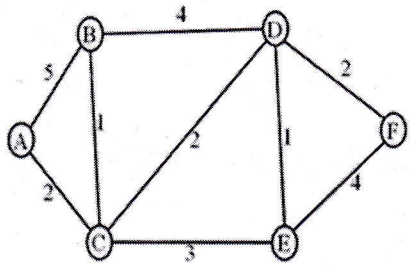


Q.2) a) Define the following terms with respect to Graphs (Any Six): [6]

1. Digraph
2. Weakly connected graph
3. Degree of a vertex
4. Cycle
5. loop
6. Spanning tree
7. Disjoint graph
8. Strongly connected graph

OR

b) Find the shortest path using Dijkstra's Algorithm from node A to every other node in the graph shown below: [6]



Q.3) a) Describe the characteristics of good hash function. Explain with example any two key-to-address transformations techniques. [6]

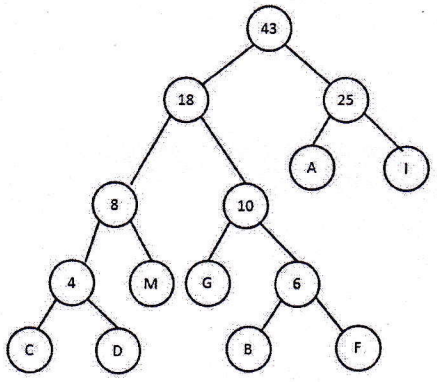
OR

b) Discuss the following with example. [6]
1. Use of Symbol Tables
2. Optimal Binary Search Tree

Q.4) a) Define Heap and describe the properties of a Heap Data Structure. Discuss the applications of heap. [4]

OR

b) Justify – "Huffman code can be used for data compression". Write the code for all the characters and the word "MAGIC" for given Huffman tree. [4]



Q.5) a) Illustrate with example the properties of Red and Black Trees. [6]

b) Describe with example any two operations that can be performed on a m-way search tree. [4]

c) Describe with example any two operations that can be performed on Red and Black tree. [4]

OR

Q.6) a) Illustrate with example any three types of rotations performed on a Splay tree. [6]

b) Describe with example how Insert and Delete operation are performed on a B+ tree. [4]

c) Discuss the use of Quad tree with example. [4]

Q.7) a) State advantages and disadvantages of indexed sequential file and sequential file. [6]

b) Compare Direct file organization with Index sequential file organization. [4]

c) List and explain any two applications of Hashed Files. [4]

OR

Q.8) a) List the various external storage devices. Explain with the help of a diagram, the structure of a Hard Disk. [6]

b) Compare index sequential and direct access files. [4]

c) Write the applications of Inverted Files. Elaborate any two. [4]