

310405

Roll No. _____

Total No of Pages: 4

310405

B. Tech. III Sem. (Main) Exam., Dec. - 2019

Common for CS/IT

3CS4-05 Data Structures and Algorithms

Time: 3 Hours

Maximum Marks: 120

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 10×2 marks = 20 marks. All ten questions are compulsory.

Part – B: Analytical/Problem Solving questions 5×8 marks = 40 marks. Candidates have to answer five questions out of seven.

Part – C: Descriptive/Analytical/Problem Solving questions 4×15 marks = 60 marks. Candidates have to answer four questions out of five.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART - A

Q.1 What are the basic operations on stack?

Q.2 What is linear data structure?

Q.3 What is a Queue in data structure?

Q.4 Differentiate Graph and Tree.

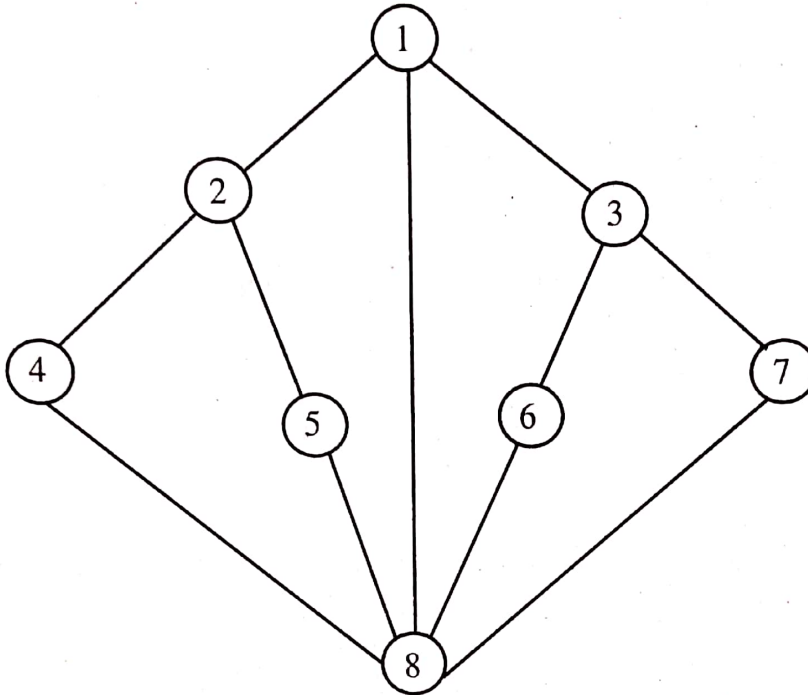
- Q.5 Write down the basic property of a binary tree.
- Q.6 What is the prefix and postfix notation of $(a + b) * (c + d)$?
- Q.7 Explain the advantage of circular Queue over basic Queue.
- Q.8 What is traversing?
- Q.9 Explain the use of Hash function.
- Q.10 Explain the advantage of Double Link List over Single Link List.

PART – B

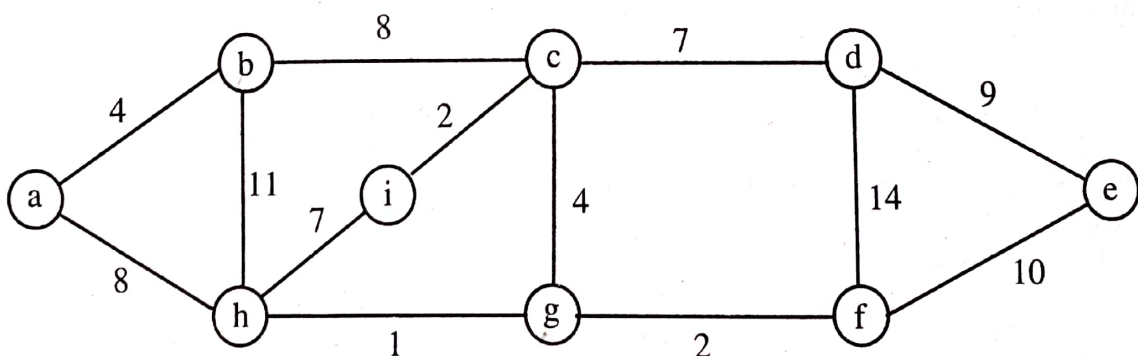
- Q.1 What is bubble sort and how bubble sort work?
- Q.2 Explain Tower of Hanoi with Example of $n = 3$.
- Q.3 What is searching? Is binary search faster than Sequential Search? Explain Your Answer.
- Q.4 What is an AVL Tree? Explain with example.
- Q.5 Construct a heap sort with the following sequence –
 $\{25, 19, 18, 6, 15, 10, 1, 5, 7, 13,\}$
- Q.6 Sort the following array using Merge – sort algorithm.
 $\{4, 8, 1, 45, 6, 20, 14, 3, 26, 31\}$
- Q.7 Write down the algorithm to reverse the single link list.

PART – C

Q.1 Explain BFS and DFS on the graph with the help of Algorithm. Find BFS and DFS on the given graph.



Q.2 Design Kruskal's algorithm for minimum spanning tree. Find the minimum spanning tree of the given graph using Prim's and Kruskal's algorithm.



Q.3 Explain the use of stack for evaluating arithmetic expression. Convert the following expression in postfix notation using stack –

$$\{(a + b) * c - d\} / \{e + f * (g - h)\}$$

Q.4 What is double link list? Write algorithm to insert a node at the start and at the end of a double link list.

Q.5 Explain the link list representation of binary tree. Develop algorithm for insertion and deletion of a node in this tree.
