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Roll No. :

322413(22)

**B. E. (Fourth Semester) Examination,
April-May 2021**

(Old Scheme)

(CSE, IT Engg. Branch)

DATA STRUCTURES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : All questions are compulsory, attempt any two among (b, c & d) carrying 7 marks, Part (a) is compulsory carrying 2 marks.

Unit-I

1. (a) Define Data structure with operations. 2
(b) Define searching and describe an algorithm of

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Binary search. 7

(c) Define sorting and describe an algorithm of insertion sort with suitable example. 7

(d) Describe an algorithm of sparse matrices. 7

Unit-II

2. (a) Define Header linked list. 2

(b) Describe an algorithm to find the location and insert new items into linked list. 7

(c) Describe an algorithm to delete items from circular linked list. 7

(d) Define two ways link lists and describe an algorithm to delete the node from given linked list. 7

Unit-III

3. (a) Define D-Queues. 2

(b) Define recursion and briefly Explain Tower of Hanoi. 7

(c) Explain Polish notation with all types and transform given infix expression into prefix and postfix. 7

(i) $A * B + C / D$

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(ii) $((A * (B + C)) / D)$

(iii) $X = (((A * B) - (C / D)^E))$

(d) Describe an algorithm to transforming infix expression into postfix expression. Convert $A * (B + C) * D$ to postfix notation using stack. 7

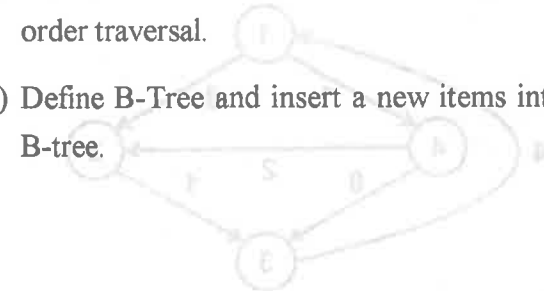
Unit-IV

4. (a) Define complete binary trees. 2

(b) Define AVL trees. Briefly explain all deletion types of AVL trees. 7

(c) Define Tree Traversal and write an algorithm of in order traversal. 7

(d) Define B-Tree and insert a new items into given B-tree. 7

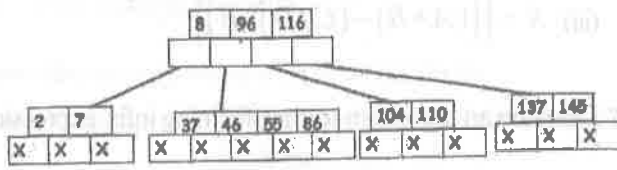


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[4]

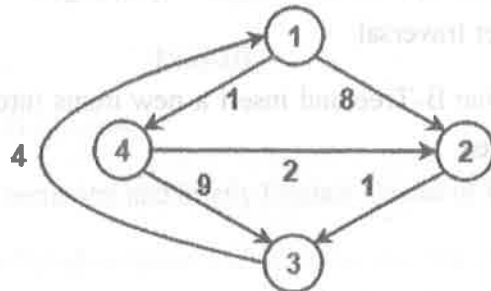
5-Way Search Tree



Insert 4, 5, 58, 6 in the order

Unit-V

5. (a) Define Graph. 2
- (b) Define Floyd Warshall Algorithm with advantages. 7
consider the following directed weighted graph.

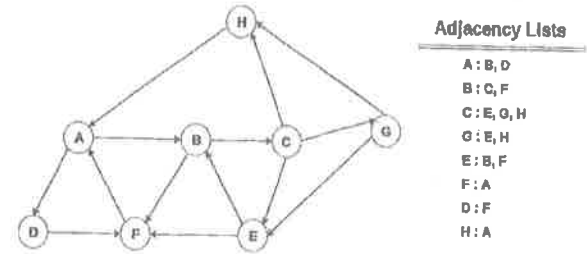


Using Floyd Warshall Algorithm, Find the shortest path distance between every pair of vertices.

[5]

- (c) Explain and write an algorithm of depth first search. 7

Consider the graph G along with its adjacency list, given in the figure below. Calculate the order to print all the nodes of the graph starting from node H, by using depth first search (DFS) algorithm.



- (d) Briefly explain Topological sorting. 7