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B. E. (Fourth Semester) Examination, 2020

(Old Scheme)

(CSE, IT Branch)

DATA STRUCTURES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. The first part (a) is compulsory and attempt any two from rest three questions in each unit.

Unit-I

1. (a) Define data structure and classify the data structure. 2
- (b) Write an algorithm to delete an element from the start of a linear array. What changes will occur if an element is deleted from the end of the linear array? 7

[2]

- (c) Sort the given array of elements using insertion sort, algorithm in ascending order. Comment on the complexity of insertion sort. 7
- (d) What do you understand by binary search? Illustrate the binary search to search the number 24 in the list of number : <11, 36, 24, 65, 54, 48, 70>. 7

Unit-II

2. (a) What do you understand by garbage collection? 2
- (b) Write an algorithm to add two polynomial equations. 7
- (c) Write an algorithm to insert a new node at the beginning, at middle position and at the end of a singly linked list. 7
- (d) Write an algorithm to traverse a doubly linked list. 7

Unit-III

3. (a) Evaluate the following equation :
6, 3, 2, +, *, 24, 6, /, - 2
- (b) What is a Queue? How is queue represented? What is the difference between Dequeue and priority queue. 7

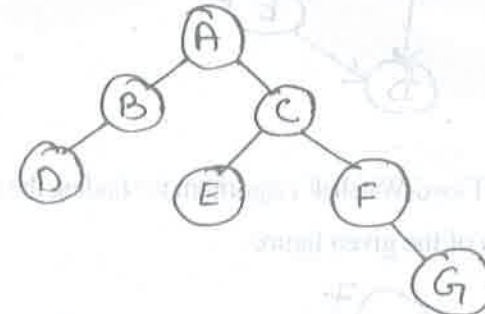
322413(22)

[3]

- (c) Explain tower of Hanoi problem and also explain how it can be solved using recursion? 7
- (d) Write an algorithm for POSN and POP in a stack where the stack is implemented using array. 7

Unit-IV

4. (a) What are binary trees? How is it represented in memory? 2
- (b) What do you understand by traversing a tree? Traverse the given binary tree in post order. 7



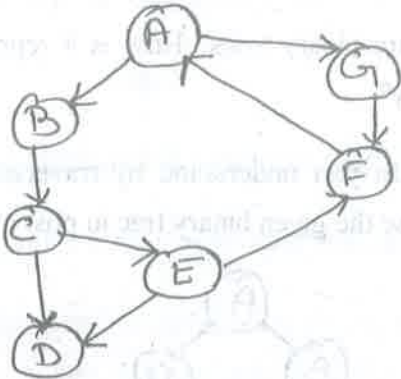
- (c) Make a binary search tree of values :
60, 50, 140, 90 and 20. 7
- (d) Create an AVL tree using following keys :
3, 5, 11, 8, 4, 1, 12, 7, 2, 6, 10. 7

322413(22)

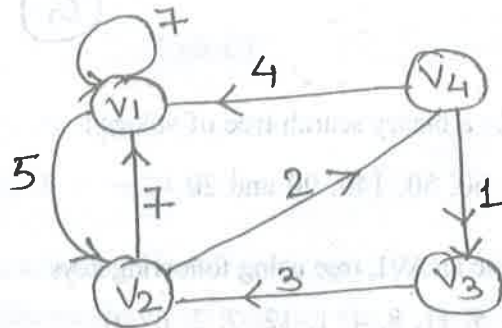
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Unit-V

- 5. (a) Illustrate the used of adjacency matrix. 2
- (b) What do you understand by breadth first search and depth first search? Use depth first search to traverse the given graph if source node is node A. 7



- (c) Use Floyd-Warshall's algorithm for finding the shortest path of the given figure : 7



- (d) Explain Prim's algorithm for finding minimal spanning tree with an example. 7