

**322413 (22)**

BE (4<sup>th</sup> Semester)

Examination, Nov.- Dec., 2021

Branch : CSE, IT

**DATA STRUCTURES**

*Time Allowed : Three Hours*

*Maximum Marks : 80*

*Minimum Pass Marks : 28*

**Note :** Part (a) of each question is compulsory. Attempt

any two from the remaining parts (b), (c) and (d).

**Q. 1.** (a) Specify the necessary condition for binary

search? Comment on the performance of

binary search over linear search.

2

(2)

(b) Write an algorithm for polynomial addition

using array. Explain using an example. 7

(c) Sort the given list of number using bubble

sort. What is the complexity of the bubble

sort algorithm : 7

< 2, 3, 18, 17, 5, 1 >

(d) Consider a two dimensional array A[20] [50]

which requires 4 bytes of storage. Let the

base address of data is 2000. Determine the

location of A[10] [10] when the array is stored

as : 7

(i) Row major order

(ii) Column major order

(3)

Q. 2. (a) What do you understand by traversing ? 2

(b) What do you understand by doubly linked

list ? Write an algorithm to insert a new node

in between two nodes in a doubly linked

list.

7

(c) Write an algorithm that merges two sorted

linear linked lists and implement it using an

example.

7

(d) Explain circular doubly linked list ?

7

Q. 3. (a) What do you understand by recursion ? 2

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(4)

- (b) Define polish notation. Convert the following infix expression to postfix expression using stack. 7

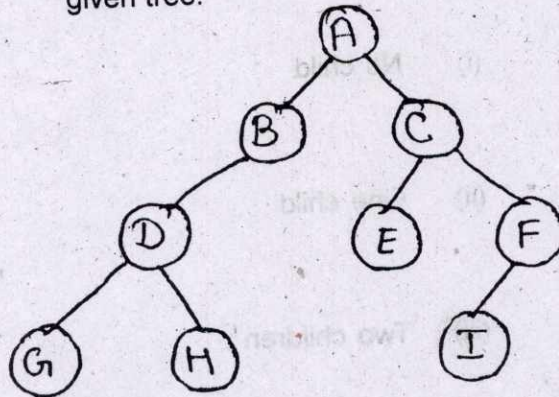
$$(A + B) * C / D + E \wedge F / G$$

- (c) Write an algorithm for insertion and deletion in queue assuming it as linked list. Illustrate the algorithm with an example. 7
- (d) Write an algorithm for recursive solution to Tower of Hanoi problem for N disks. Illustrate the algorithm using 3 disks. 7

(5)

Q. 4. (a) What do you mean by a complete binary tree? If  $L$  is the number of levels of a complete binary tree then how many nodes are present in it. 2

(b) Write an algorithm to find the preorder traversal. Give the preorder traversal of the given tree. 7



(6)

(c) What do you understand by AVL tree?

Create an AVL tree for the following set of

values :

7

3, 5, 11, 8, 4, 1, 12, 7, 2, 6, 10

(d) How will you delete a node from binary

search tree if it has :

7

(i) No child

(ii) One child

(iii) Two children

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(7)

Q. 5. (a) What do you understand by strongly connected graph? 2

(b) Describe the various graph representation methods. 7

(c) Write an algorithm to perform breadth first search technique? Illustrate with an example. 7

(d) Using Floyd-Warshall algorithm construct the shortest path for the following graph. Show the matrix  $D^{(k)}$  generated in each iteration of the algorithm. 7

(8)

