

Seat No. : _____

NR-102

November-2017

B.C.A., Sem.-III

CC-202 : Data Structures

Time : 3 Hours]

[Max. Marks : 70

1. (A) What is Data Structure ? Explain classification of data structure with diagram. **6**

OR

Write an algorithm to sort an array using Insertion sort with an example.

- (B) Answer the following : **8**

- (1) Consider a 20×5 two-dimensional array marks which has its base address = 2000 and the size of an element = 2. Compute the address of the element, marks [18][4] for both row and column major.
- (2) Write an algorithm for deleting the last node from a doubly linked list.

OR

Answer the following :

- (1) Write algorithm to search an element with linear search. Explain using example.
- (2) List types of linked list and explain its representation with proper diagram.

2. (A) Explain stack operations with example. **6**

OR

Write algorithm for insertion and deletion of an item from a Simple Queue.

- (B) Answer the following : **8**

- (1) Convert the following from infix to postfix using algorithm :
 $A - (B / C + (D \% E * F) / G) * H$
- (2) Explain Reverse Polish in stack with example.

OR

- (1) What is Queue ? List its types and explain Priority Queue.
- (2) List applications of Stack and explain Recursion.

3. (A) Create B-tree of order 5 for the following data : **6**

Order : 1, 12, 8, 2, 25, 5, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55, 45

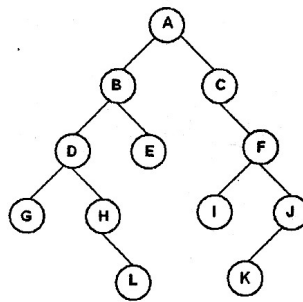
OR

Write a note on Height Balanced Tree.

(B) Answer the following :

8

- (1) Explain max heap tree with example.
- (2) Find the In-order, Pre-order and Post-order traversal for the below binary tree T :



Binary Tree – T

OR

Answer the following :

- (1) Construct expression tree for $((a - b) + (c/d)) \% ((e^f)/(g+h))$.
- (2) Write a note on Binary Search Tree and create a Binary Search Tree using the following data elements : 45, 39, 56, 12, 34, 78, 32, 10, 89, 54, 67, 81

4. (A) Explain Prim's algorithm with example.

6

OR

What is Minimum Spanning Tree (MST) ? Take a weighted graph and draw possible Spanning trees and find MST from it.

(B) Answer the following :

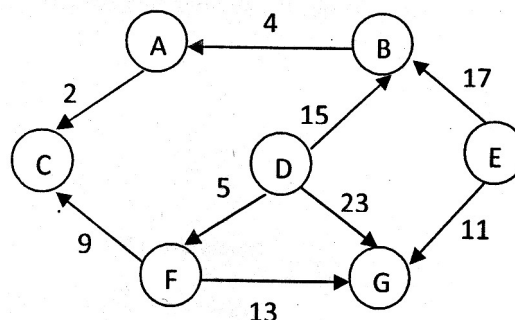
8

- (1) Explain representation of graph with example.
- (2) Explain Depth-First Search Algorithm.

OR

Answer the following :

- (1) Consider the graph G given below. Take D as the initial node, execute the Dijkstra's algorithm on it.



Graph : G

- (2) Explain Breadth-First Search Algorithm.

5. Do as directed :

14

- (1) A linked list is a _____.
(a) Random Access Structure (b) Sequential Access Structure
(c) Both (d) None of these
- (2) If an array is declared as `int arr [5] [5]`, then it can store _____ elements.
(a) 5 (b) 25
(c) 10 (d) 0
- (3) _____ uses divide-and-conquer method.
(a) Quick Sort (b) Merge Sort
(c) Selection Sort (d) Insertion Sort
- (4) If an array is declared as `arr[]={1,3,5,7,9}`; then value of `sizeof (arr[3])` is _____.
(a) 1 (b) 2
(c) 3 (d) 8
- (5) _____ function places an element on the stack.
(a) Pop() (b) Push()
(c) Peek() (d) isEmpty()
- (6) Reverse polish notation is the other name of _____.
(a) Infix expression (b) Prefix expression
(c) Postfix expression (d) Algebraic expression
- (7) The function that deletes values from a queue is called _____.
(a) Enqueue (b) Dequeue
(c) Pop (d) Peek
- (8) The circular queue will be full only when _____.
(a) `FRONT=MAX-1` and `REAR=MAX-1`
(b) `FRONT=0` and `REAR=MAX-1`
(c) `FRONT=MAX-1` and `REAR=0`
(d) `FRONT=0` and `REAR=0`
- (9) Degree of a leaf node is _____.
(a) 0 (b) 1
(c) 2 (d) 3
- (10) When the left sub-tree of the tree is one level higher than that of the right sub-tree, then the balance factor is _____.
(a) 0 (b) 1
(c) -1 (d) 2
- (11) The depth of root node is _____.
(a) 3 (b) 2
(c) 1 (d) 0

(12) A graph in which there exists a path between any two of its nodes is called

- | | |
|--------------------|---------------------|
| (a) Complete graph | (b) Connected graph |
| (c) Digraph | (d) In-direct graph |

(13) An edge that has identical end-points is called a _____.

- | | |
|----------------|----------------|
| (a) Multi-path | (b) Loop |
| (c) Cycle | (d) Multi-edge |

(14) The term optimal can mean _____

- | | |
|--------------|------------------|
| (a) Shortest | (b) Cheapest |
| (c) Fastest | (d) All of these |
