

Seat No. : 128

# DB-101

December-2018

B.C.A., Sem.-III

CC-202 : Data Structures  
(Old & New Course)

Time : 2:30 Hours]

[Max. Marks : 70

1. (A) Answer the following :

- (1) Write an algorithm to insert an element at beginning and delete an element from end in a doubly linked list. 7
- (2) Explain selection sort technique with example. Also write an algorithm to sort an array elements using selection sort. 7

OR

- (1) What is linked list ? List out types of linked list. Explain structure and representation of doubly linked list with example. 7
- (2) Explain binary search technique with example. Also write an algorithm to search an element in array using binary search technique. 7

(B) Do as directed. (Any Four) 4

- (1) Give the difference between array and linked list.
- (2) Write Formula to find address of the element in one dimensional array.
- (3) Define data structure.
- (4) Draw the classification of data structure.
- (5) What is sparse matrix ?
- (6) For Linear search, elements \_\_\_\_\_ order in the list.
  - (a) must be stored in sorted
  - (b) must be stored in unsorted
  - (c) may be stored in sorted or unsorted
  - (d) none of these

2. (A) Answer the following :
- (1) Show the stack status after each operation in the conversion of following expression to postfix :  $A + (B * C - (D/E - F) * G) * H$
  - (2) Write an algorithm to insert and delete an item from a queue using linked list.

OR

- (1) What is queue ? List out types of queue. Explain Insert and Delete operations of circular queue with example.
- (2) Write an algorithm for push, pop and peep operations of stack.

(B) Do as directed. (Any Four)

- (1) List out stack notations.
- (2) Stack is \_\_\_\_\_ data structure.
  - (a) FIFO
  - (b) FCFS
  - (c) LIFO
  - (d) None of these
- (3) Define priority queue.
- (4) Write any two applications of stack.
- (5) \_\_\_\_\_ is very useful in situation when data have to be stored and then retrieved in reverse order.
  - (a) Stack
  - (b) Queue
  - (c) Linked list
  - (d) None of these
- (6) Which data structure allows inserting and deleting data elements at either end ?
  - (a) Deques
  - (b) Queue
  - (c) Circular queue
  - (d) None of these

3. (A) Answer the following :

- (1) Explain one-way and two-way threaded binary tree with example. 7
- (2) Write steps to create expression tree. Create an expression tree for following expression.  $(M-N) * Z + P / (X + Z)$  7

OR

- (1) What is Binary tree ? Write algorithms for in-order, pre-order, and post-order traversals of binary tree.
- (2) Write steps to create binary search tree. Create binary search tree with the following data :  
25, 15, 10, 4, 12, 22, 18, 24, 50, 35, 31, 44, 70, 66, 90

(B) Define following terms : (Any Three) 3

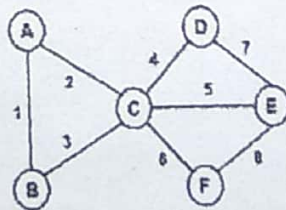
- (1) Complete binary tree
- (2) Leaf node
- (3) Root node
- (4) Sibling
- (5) Degree of a node

4. (A) Answer the following :

- (1) Write algorithm for Breadth first search traversal. Explain Breadth first search with example. 7
- (2) Explain Dijkstra's algorithm with proper example. 7

OR

- (1) What is minimum spanning tree ? Write Kruskal's algorithm. Find the minimum spanning tree using Kruskal's algorithm.



- (2) What is graph ? Explain different representations of graph with example.

(B) Do as directed. (Any **Three**)

- (1) Define Multi-graph.
- (2) Which node has zero degree ?
  - (a) Source
  - (b) Sink
  - (c) Isolated
  - (d) None of these
- (3) Give full form of MST.
- (4) \_\_\_\_\_ is a non-linear data structure.
  - (a) Stack
  - (b) Graph
  - (c) Queue
  - (d) None of these
- (5) A directed graph that has no cycles is called \_\_\_\_\_.
  - (a) Acyclic graph
  - (b) Multi graph
  - (c) Complete graph
  - (d) None of these