

Seat No. : _____

DC-101

December-2021

B.C.A., Sem.-III

CC-202 : Data Structures (New Course)

Time : 2 Hours]

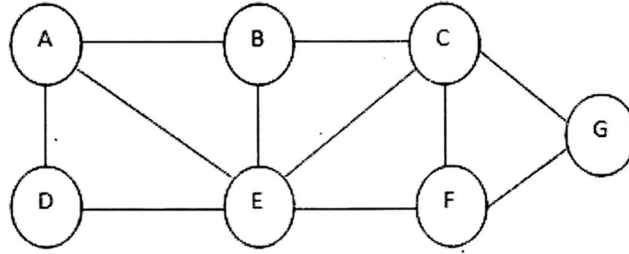
[Max. Marks : 50

- Instructions :**
- (1) All Questions of Section – I carry equal marks.
 - (2) Attempt any **two** Questions in Section – I.
 - (3) Question – **5** in Section – II is COMPULSORY, Attempt any **Five**.

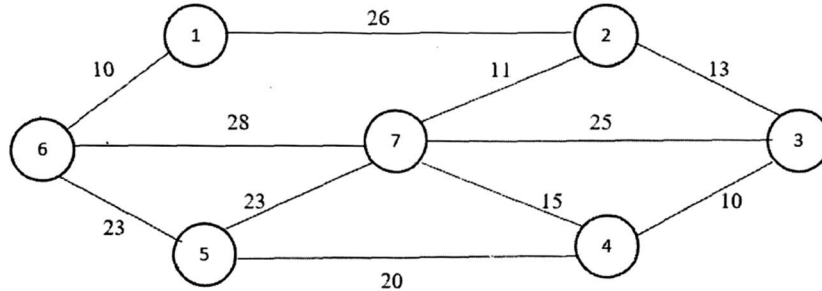
Section – I

1. (A) (i) What is Abstract Data Type (ADT) ? Explain with definition. **10**
(ii) Write an algorithm to insert a node at front in doubly linked list.
(B) (i) Write an algorithm of the bubble sort. **10**
(ii) Define the trace of the binary search using below list.
11, 22, 30, 33, 40, 44, 55, 60, 66, 77, 80, 88, 99 [*Search Key* = 40]
2. (A) (i) Write the algorithm of the *Push* and *Pop* operations of the stack using array. **10**
(ii) Write Postfix notation of the infix as $(A + B \wedge D) / (E - F) + G$
(B) (i) Explain and define the types of queues. **10**
(ii) What is priority queue ? Explain in brief.
3. (A) (i) Draw the binary tree of the below order : **10**
In-Order : 7, 9, 4, 2, 5, 1, 3, 6, 8
Pre-Order : 1, 2, 4, 7, 9, 5, 3, 6, 8
(ii) Draw the Binary Search Tree (BST) with AVL notation of the below list
35, 55, 45, 5, 75, 2, 25, 85
(B) (i) Draw the Expression tree of the above infix expression of Que. 2 A(ii) **10**
(ii) Construct B-tree of order 3 by inserting of numbers 1 to 10.

4. (A) Perform the DFS traversal of the following graph : 10



- (B) (i) Find minimum span using Kruskal's scheme of the below graph 10



- (ii) Define the adjacency List and adjacency Matrix of the above graph of Que. 4 B(i).

Section – II

5. Attempt any **Five** : 10

- (1) Abstract Data Type (ADT) is a collection of

(a) Member Data	(b) Member Function
(c) Both (a) and (b)	(d) Neither (a) and (b)
- (2) A sorted list followed by few 'Random' elements, which sorting method most suitable for the task ?

(a) Bubble sort	(b) Selection sort
(c) Insertion sort	(d) Quick sort
- (3) Worst case time complexity of sequential search is $O(n)$ (True/False).
- (4) Which one is non-linear data structure ?

(a) Queue	(b) Graph
(c) Array	(d) Linked list
- (5) Which one is **Not** the part of the linked list ?

(a) Non-primitive	(b) Dynamic
(c) Flexible	(d) Fixed size

- (6) If stack is empty, then the value of the stack (TOP) would be
- (a) 0 (b) -1
(c) 1 (d) None of this
- (7) Queue followed by the LIFO mechanism (True/False).
- (8) Which one is **Not** a binary tree ?
- (a) Expression tree (b) AVL tree
(c) B-tree (d) Binary search tree(BST)
- (9) Best case time complexity of binary search is
- (a) $O(n \log n)$ (b) $O(n)$
(c) $O(1)$ (d) 2^n
- (10) Depth First Search (DFS) traverse using Stack mechanism (true/false).
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