Roll No: | | | | | | | | | | | | | |

BTECH
(SEM III) THEORY EXAMINATION 2021-22
DATA STRUCTURE USING C

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a.	Define Data Structures and also the need of data structure.
b.	What do you mean by time space trade off?
c.	Differentiate between linked list and array.
d.	What do you mean by collision in hashing?
e.	What is the advantage of using Circular Queue over linear Queue?
f.	Define priority queue and its uses?
g.	List any two difference between graph and tree.
h.	What are the disadvantages of representing binary tree using array?
i.	What do you mean by in place sorting algorithm?
j.	List any two difference between stack and queue?

SECTION B

2. Attempt any *three* of the following: 10x3=30

a.	Explain asymptotic notations? Show relationship between f(n) and g(n) in each notation.
b.	Write the push and pop functions in C simulating push and pop operations of stack implemented using an array.
c.	Explain tree traversal techniques and also write algorithm of various tree traversal techniques.
d.	Write algorithm of DFS.
e.	Construct AVL tree with the following keys 35, 44, 80, 85, 67,89,25,16,10,14.

SECTION C

3. Attempt any *one* part of the following: 10x1=10

a.	Write C functions to insert a node at the beginning and delete the last node from a doubly linked list. Also state the advantages and disadvantages of doubly linked list.
b.	An array ARR[30][20] is stored in the memory with each element occupying 4 bytes and base address is 1000. Find out the address of the index ARR [22][15] using row major order (0 indexing is used).

4. Attempt any *one* part of the following: 10x1=10

a.	Convert the following infix expression into postfix expression using stack X + (Y * Z ^ D) + E / W *(F /H)
b.	Explain circular queue and write program of enqueue and dequeue operations of circular queue?

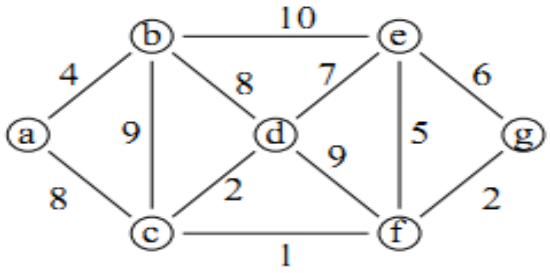
5. Attempt any *one* part of the following: 10x1=10

a.	Describe Huffman algorithm with the help of example.
b.	Construct binary tree with following traversals: Inorder: B C A E G D H F I J Preorder: A B C D E G F H I J Also find Post order traversal of it.

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6. Attempt any *one* part of the following: 10x1=10

a.	Apply Kruskal algorithm to calculate the cost of the minimum spanning tree for below graph. 
b.	Write Dijkstra algorithm for single source shortest path.

7. Attempt any *one* part of the following: 10x1=10

a.	Write algorithm of quick sort? Trace your algorithm on the following data elements to sort the list in ascending order: 2, 16, 5, 21, 7, 57, 52, 85, 69, 1, 9, 10.
b.	Explain hashing and various collision resolution techniques with example?

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