

Subject Code: BOE306

Roll No:

BTECH

(SEM III) THEORY EXAMINATION 2023-24

BASICS DATA STRUCTURE & ALGORITHMS

TIME: 3HRS

M.MARKS: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

$2 \ge 7 = 14$

Q no.	Question	Marks	CO	
a.	Define Data structure. Describe various types of it.	2	1	
b.	What is big oh in asymptotic notation?	2	1	
c.	Convert the following arithmetic infix expression into its equivalent	2	2	
	prefix expression.			
	Expression: A-B/C+D*E+F			
d.	What do you understand by stable and in place sorting? Explain.	2	3	
e.	Define complete binary tree with suitable example.	2	4	
f.	Define Threaded binary tree with advantage over binary tree.	2	4	
g.	How graphs are represented in memory? Explain with the help of	2	5	9
	example			5'
	SECTION B	10	׼'	

SECTION B

Attempt any three of the following: 2.

Explain Sparse Matrix and its representation. a. 7 1 b. Define queue. Explain various operations performed on queue with 7 2 suitable example Use quick sort algorithm to sort 15,22,30,10,15,64,1,3,9,2. Is it a stable 7 3 c. sorting algorithm? – Justify. Define spanning tree. Also construct minimum spanning tree using d. 7 4 prim's algorithm for given graph. 12 B 1 17 F 2 15 19 10 14 6 D Insert the following elements in initially empty B-tree of degree 5: 7 5 e. 4,12,45,33,25,30,7,1,14,56,26,65,31,38,44

SECTION C

3. Attempt any one part of the following:

$7 \ge 1 = 7$

a.	Write a C program to insert a node at starting and particular position of	7	1
	singly linked list with n numbers of nodes.		
b.	Write a C function to perform insertion and deletion in an array.	7	1

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Attempt any one part of the following: 4.

a.	State Tower of Hanoi problem. Write recursive algorithm to solve it.	7	2
b.	Translate the infix string $(a+b^c^d)^*(e+f/d)$ to reverse polish notation	7	2
	using stack by showing every step.		

5. Attempt any one part of the following:

a.	Consider a hash table with 9 slots. The hash function is $h(k)=kmod9$.	7	3
	The collisions are Resolved by chaining. The following 9 keys are		
	inserted in the order 5,28,19,15,10,33,12, 17,10. What are the maximum,		
	minimum and average chain lengths in the hash table.		
b.	How binary search is different from linear search. Perform binary search	7	3
	to find element 30 in the list: 12, 16, 20,27,30,32,40		

6. Attempt any one part of the following:

6.	Attempt any <i>one</i> part of the following:	7 x 1 =	- 7
a.	What is Binary Search Tree? Write the algorithm to delete an element	7	4
	from the Binary Search Tree.	1	Z.
b.	Draw a binary tree which following traversal with each and every step:	7	4
	In order: DBHEAIF J CG		
	Preorder: ABDEHCFIJG	P	

7. Attempt any one part of the following:

a.	Write an algorithm for BFS Traversal. Consider the graph given in	7	5
	figure. Perform Breadth first search beginning at vertex 1. List the		
	vertices in which they are visited.		
	9 <u>6</u>		
	5 7		
b.	Explain Warshal's algorithm with the help of example.	7	5
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7 x 1 = 7

 $7 \ge 1 = 7$

7 x 1 = 7

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