END SEMESTER EXAMINATION, 2021-22
B.Tech. / B.Tech. M.Tech. (Int.) B.Tech. MBA (Int.) (SEMESTER : 03)
CSE 242 : DATA STRUCTURE

Time: 03 Hrs.

Max. Marks: 100

Instructions: 1. All questions are compulsory
2. *Assume missing data suitably, if any.*

CO1: **Select** appropriate data structures as applied to specified problem definition.

CO2: **Choose** the suitable data structures like arrays, linked list, stacks and queues to solve real world problems efficiently.

CO3: **Represent** and manipulate data using nonlinear data structures like trees and graphs to design algorithms for various applications.

CO4: **Compare** various techniques for searching and sorting.

CO5: **Design** and implement an appropriate hashing function for an application

CO6: **Formulate** new solutions for programing problems or improve existing code using learned algorithms and data structures

SECTION-A

All Questions are Compulsory:

(10×4=40 Marks)

	COs	Marks	BTL
1. List advantages of linked list over arrays.	CO1	4	K1
2. Evaluate time complexity of insertion sort.	CO1	4	K2
3. List different ways of implement polynomial ADT.	CO2	4	K1
4. Define in-degree and out-degree of a graph	CO2	4	K2
5. Discuss deque with example.	CO3	4	K2
6. What are the properties of Minimum Cost Spanning (MST) Tree?	CO3	4	K3
7. Discuss rotation of AVL tree.	CO4	4	K2
8. What are the disadvantages of circular linked list?	CO4	4	K3
9. Evaluate the best, average, worst case time complexity of Bubble sort.	CO5	4	K2
10. Explain the properties of sparse matrix?	CO5	4	K3

SECTION-B

All Questions are Compulsory:

(3×6=18 Marks)

	COs	Marks	BTL
11. a) Write an algorithm to delete an element anywhere from doubly linked list.	CO3	6	K4

OR

b) Write applications of single linked list to represent polynomial expressions.

	COs	Marks	BTL
12. a) Write an algorithm of insertion in queue using linked list.	CO4	6	K4

OR

b) Explain polynomial addition using linked list.

13. a)   Write an algorithm to push and pop an element using array.

<center>OR</center>

b)   Write an algorithm to push and pop an element from linked stack

<center>

SECTION-C

</center>

All Questions are Compulsory: **(3×10=30 Marks)**

14. (a)   Write a pseudocode for converting infix expressions into postfix.   CO3   10   K4/K5

<center>OR</center>

(b)   Explain time complexity and space complexity of an algorithm with example.

15. (a)   Convert following expression $X+(Y * Z) - ((N * M +O) /P)$ in to post form.   CO4   10   K4/K5

<center>OR</center>

(b)   Rearrange following numbers using selection sort: 10, 6, 3, 7, 17, 26, 56, 32, 72 and discuss its time complexity.

16. (a)   What is a binary tree? Construct a binary tree given the pre-order traversal and inorder traversals as follows: CO5   10   K4/K5
Pre-Order Traversal: G B Q A C K F P D E R H
In-Order Traversal: Q B K C F A G P E D H R

<center>OR</center>

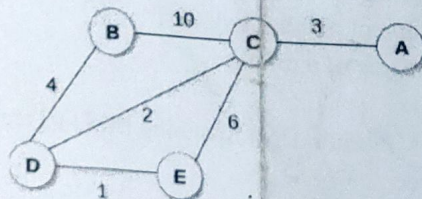(b)   Construct AVL tree for the following: 1, 2, 3, 4, 5, 6, 7

<center>

SECTION-D
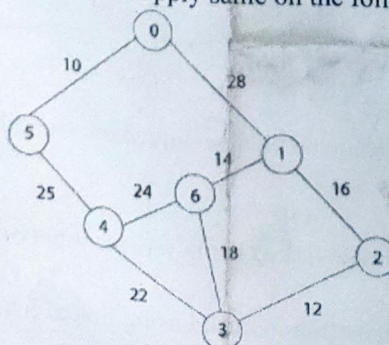
</center>

All Questions are Compulsory:

17. (a)   Explain Prim's algorithm and apply the same on the following graph.   CO6   12   K5/K6

(1×12=12 Marks)

<center>OR</center>

(b)   Write an algorithm for minimum cost spanning tree using Kruskal's algorithm and apply same on the following graph:

<center>* * * * * * *</center>