350

Total No. of Questions-8] [Total No. of Printed Pages-3

B.E V Semester Examination

BE - V/12 (A)

232025

COMP. ENGG.

Course No. : COM - 502

(Data Structures)

Time Allowed- 3 Hours *Maximum Marks: 100*

Note: Attempt any **Five** questions selecting at least **two** from each section.

Section - I

1. a) Define data structures. What is the difference between data structures and data types? What is the relationship between data structures and algorithm? Explain with an example.**(10)**

   b) Define Recursion. Give its merits and demerits. Write a recursive algorithm for finding the factorial of a number 'n'. **(10)**

2. a) Write a C program to implement queue using linked list.**(10)**

   b) Describe the evaluation of postfix notation using stack with example giving algorithm for the same. **(10)**

3. a) What is doubly linked list? What are the advantages and Disadvantages of doubly linked list? Write an algorithm to delete a n element from doubly linked list. **(10)**

b) Write algorithm for following:

i) Reversing linear linked list **(5)**

ii) Concatenate two circular linked list **(5)**

4. i) What are Sparse Matrices? How do you represent Sparse Matrix? **(5)**

ii) What are the advantages and Disadvantages of circular queues over linear queues. **(5)**

iii) Discuss the applications of stacks **(5)**

iv) Write short note on Time and Space Complexity of an algorithm **(5)**

Section - II

5. a) What are AVL trees? Discuss how the balance property of AVL tree is maintained when insertion or deletion on AVL tree occurs. **(10)**

b) Define binary tree and complete binary tree with an example.

Consider following in order and preorder traversal of binary tree: **(10)**

Preorder : G, B, Q, A, C, K, F, P, D, E, R, H

Inorder: Q, B, K, C, F, A, G, P, E, D, H, R

Draw the original tree.

6. Develop an algorithm for shell sort and explain its working for following list of numbers. 35, 20, 40, 100,3 10,15

Why shell sort is more efficient than simple Insertion sort. **(20)**

7. a) What is a Graph? Explain cyclic and acyclic graphs. Also Explain the adjacency and linked representation of Graph. **(10)**

b) What is minimum cost spanning tree? Write and Explain any one method to obtain minimum cost spanning tree of a graph. **(10)**

8. a) Write a program in 'C' language to search the given number 'num' using binary search in a list of numbers. What are the advantages and disadvantages of binary search over linear search? **(10)**

b) Write a short note on Threaded Binary Trees. **(10)**