Enrol. No. ....

END SEMESTER EXAMINATION : NOV.–DEC., 2021

DATA STRUCTURES USING C

Time : 3 Hrs.

Maximum Marks : 60

Note: **Attempt questions from all sections as directed.**

SECTION – A (24 Marks)

Attempt any **four** questions out of five.
Each question carries **06** marks.

1. (a) Define Big Oh, Big Omega and Big Theta Notations. (3)

    (b) Consider the linear arrays ABC(5:50), XYZ (–5:10) and MNO(18:52).

    (i) Find the number of elements in each array.

    (ii) Suppose Base(ABC) = 300, Base(XYZ) = 250, Base(MNO) = 325 and w=4 words per memory cell for ABC, XYZ and MNO.

    Find the address of ABC[15], XYZ[–1] and MNO[49]. (3)

P.T.O.

(1270)

2. (a) Discuss the difference between calloc() and malloc() function and how these functions differ from realloc(). Justify with the help of example.

(3)

(b) Perform the following operations in the given order on an empty stack of size 5. Display the stack after each operation. Mention TOP of the stack.

POP(), PUSH(5), PUSH(8), POP(), PUSH(4), PUSH(2), POP()　　　　　　(3)

3. (a) Discuss circular queue? How it is different from normal queue?　　　　　　(3)

(b) Trace the infix to postfix algorithm (clearly showing the status of stack) to find the equivalent postfix expression for the following infix expression.

A + (B * C – (D / E ^ F) * G)　　　　　　(3)

4. Write a c/c++ function to reverse a singly linked list. You can traverse the list exactly once and can use only constant, i.e., 0(1) additional storage. Briefly explain your answer.
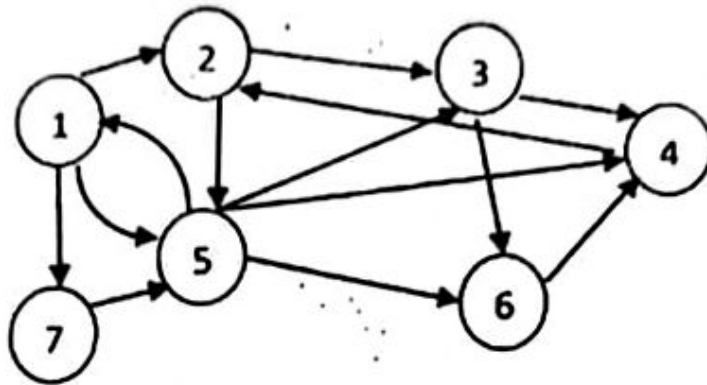
5. Let P be a linked list. Write a function called split to create two linked lists Q and R. Q should contain all elements in odd positions of P and R contains the remaining elements. Your function should not change list P. What is the complexity of your program.
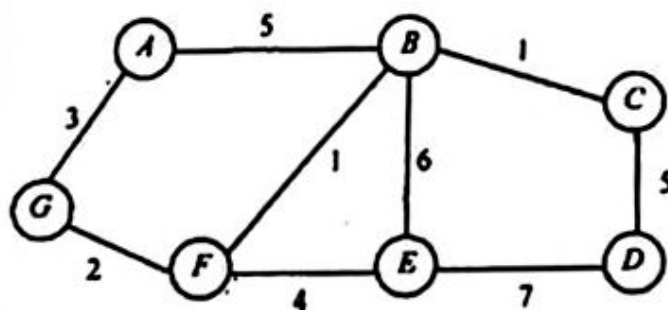
Attempt any **two** *questions out of* **three.**
Each question carries **10** *marks.*

6.

7.   (a) Write the output of DFS and BFS traversals on the graph considering starting vertex as 1.

(5)

Use Kruskal's algorithm to extract the minimum spanning tree of the graph given in figure :

(b) Write the algorithm for insertion sort with examples and discuss its complexity.   (5)

P.T.O.

8. Write an algorithm / C program to perform Quick sort. Given the following list of numbers: [21, 1, 26, 45, 29, 28, 2, 56, 34, 23, 19] find the output obtained after each recursive call of Quick sort algorithm. Write the complexity of your algorithm.

SECTION – C (16 Marks)
(Compulsory)

9. (a) Create a Binary Search Tree by inserting one integer at a time in the sequence for the following data and do in-order, Preorder and Post-order traversal of the tree.

   50, 60, 25, 40, 30, 70, 35, 10, 55, 65, 5, 12, 19, 20

   (10)

   (b) Build an AVL tree with the following values by inserting one integer at a time in the following sequence:

   23, 34 12, 67, 59, 80, 18, 20, 56, 98, 45, 29

   (6)