Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2023

Course: Data Structures — **Semester : I**
Program: MCA — **Time : 03 hrs.**
Course Code: CSEG7015 — **Max. Marks : 100**

Instructions: Read and follow the instructions written on the answer sheet front page

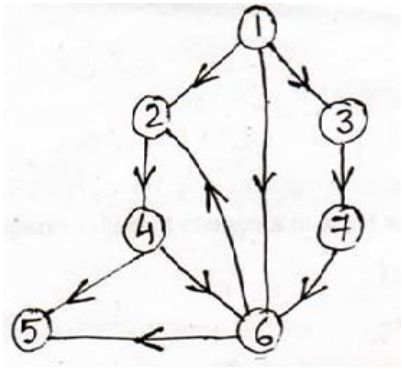
SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain the concept of hashing. Discuss how collision can be handled in a hash table?	**4**	**CO1**
Q 2	Write the algorithm for selection sort.	**4**	**CO1**

Q 3	Write the output of the following code:
	`#include<stdio.h>`
	`main()`
	`{`
	`int a[]={1,2,3,4,5};`
	`printf("%d%d%d%d%d",*a,*(a+0),*(0+a),a[0]);`
	`}`
		4	**CO2**

Q 4	Write a C function for implementing enqueue operation in a queue using array.	**4**	**CO4**

Q 5	`void abc(struct node *new1){`
	`temp = head;`
	`if(head == NULL)`
	`head = new1;`
	`else{`
	`while(temp->next!= NULL)`
	`temp = temp->next;`
	`new1->prev = temp;`
	`temp->next = new1;`
	`} }`
		4	**CO3**

	What will the above function do?		
SECTION B (4Qx10M= 40 Marks)			
Q 6	Create an AVL tree for the following sequence K, T, E, V, P, A, M, N, B.	**10**	**CO2**
Q 7	Discuss the definition and properties of a BST. Write the algorithm for deleting a node in BST.	**10**	**CO1**
Q 8	Differentiate between linear and binary search and state which one is more efficient. Also, write algorithms for both.	**10**	**CO3**
Q 9	Write C functions for implementing Push and Pop operations in a stack using linked list. Given Expression is 5*((-3-2)*(4-6)+3*2). Write algorithm and draw stack diagrams to evaluate the given expression. OR Write a C program to implement circular queue using array. Also, mention the benefits of creating a circular queue.	**10**	**CO1**
SECTION-C (2Qx20M=40 Marks)			
Q 10	Differentiate between linear and non-linear data structures with appropriate examples. Write C functions to perform the following actions: a) Creation of a doubly circular linked list. b) Insertion at the beginning of a doubly linked list. c) Deleting a particular element in a singly linked list.	**20**	**CO3**
Q 11	Write the algorithms for BFS and DFS. For the following Graph, give the traversal order with appropriate steps using BFS and DFS:  OR	**20**	**CO4**

	Define a minimum spanning tree and discuss its application. Construct the Minimum Spanning Tree from following graph using Kruskal's algorithm. Show all steps in detail.