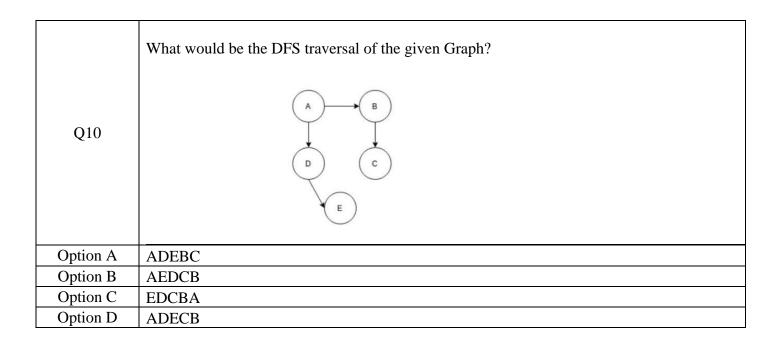Time: 2 hours 30 mins   Max. Marks: 80

Q1. All questions compulsory 2 marks each (20 Marks)

Q1	Which Data Structures is used during Recursion ?
Option A	Stack
Option B	Queue
Option C	Linked List
Option D	Graphs
Q2	The prefix form of A $ B * C -D + E / F / (G+G) is?
Option A	$ * - + ABCDE //F + GG
Option B	$ * - + ABCD //EF + GG
Option C	+ - * $ ABCD // EF + GG
Option D	/ + - * $ ABCD / EF + GG
Q3	Suppose a circular queue of capacity (n – 1) elements is implemented with an array of n elements. Assume that the insertion and deletion operation is carried out using REAR and FRONT as array index variables, respectively. Initially, REAR = FRONT = 0. The conditions to detect queue full and queue empty are
Option A	Full: (REAR+1) mod n == FRONT, empty: REAR == FRONT
Option B	Full: (REAR+1) mod n == FRONT, empty: (FRONT+1) mod n == REAR
Option C	Full: REAR == FRONT, empty: (REAR+1) mod n == FRONT
Option D	Full: (FRONT+1) mod n == REAR, empty: REAR == FRONT
Q4	Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4)$ mod 7. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.
Option A	8, _, _, _, _, _, 10
Option B	1, 8, 10, _, _, _, 3
Option C	1, _, _, _, _, _,3
Option D	1, 10, 8, _, _, _, 3
Q5	Number 14 needs to be searched using BINARY SEARCH in the following sorted list of numbers: 1, 3, 7, 9, 14, 19, 45 How many comparisons will be required to conclude that the number 14 is found at the 5th position?

Option A	2
Option B	3
Option C	4
Option D	1

Q6	In a doubly linked list, start pointer is pointing to first node and end point is pointing to last node in a list. Fill in the blanks in following code if we need to check whether given list is palindrome or not.
	
	``
	void checkPalindrome(NODE *start, NODE *end)
	{
	        int flag=1;
	        while(start!=end)
	        {
	                if(start->num != end->num)
	                { flag=0; break; }
	                if(start->next == end)
	                        break;
	                ---------------------------------(line1)
	                ---------------------------------(line2)
	        }
	        If(flag==1)
	                printf("Palindrome");
	        else
	                printf("Not palindrome");
	}
	``

Option A	start++, end--
Option B	start = start --> next, end = end --> next
Option C	start = start --> prev, end = end --> next
Option D	start = start --> next, end = end --> prev

Q7	What does the following block of code does:
	
	``
	struct Node{
	    int value;
	    Node* next;
	}
	void dosomething(struct Node **head, int key)
	{
	        struct Node *temp=*head;
	        struct Node *prev;
	        if(temp!=NULL && temp->data==key)
	        {
	                *head=temp->next;
	                free(temp);
	        }
	        while(temp!=NULL && temp->data!=key)
	        {
	                prev=temp;
	                temp=temp->next;
	        }
	        if (temp==NULL)
	                printf("node is not present in the linked list");
	        else
	                prev->next=temp->next;
	        free(temp);
	}
	``

Option A	Insert element KEY in linked list

Option B	Delete first occurrence of Key element
Option C	Delete last occurrence of key element
Option D	Delete all occurrences of key elements

Q8	Give the pre order traversal if we delete the node 30, 70 and 15 from the below tree

Option A	20 52 10 25 40 60
Option B	40 20 50 10 25 60
Option C	60 20 10 25 50 40
Option D	40 20 10 25 50 60

Q9	Consider the given binary search tree. Compute Inorder traversal for the same

Option A	H D I B E A F J C G
Option B	A B D H I E C F J G
Option C	H I D E B J F G C A
Option D	H D I E B A J F G C

	What would be the DFS traversal of the given Graph?
Q10	
Option A	ADEBC
Option B	AEDCB
Option C	EDCBA
Option D	ADECB

Q2. (20 Marks Each)	Solve any Four Questions out of Six	05 marks each
A	Explain Linear and Non-Linear data structures.	
B	Explain Topological Sorting on Graph *G*	
C	Explain Huffman Algorithm with appropriate example	
D	Write C function for performing deletion from Binary Search Tree.	
E	Elaborate various ways of Graph Representation with appropriate example.	
F	Write C program for Binary Search using Recursion	

Q3. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each

A	Write a program in C language to perform the following operations on the Circular Linked List.
	    a. Insert at beginning
	    b. Insert at the end
	    c. Delete at beginning
	    d. Delete at the end	

B	Create a Binary Search Tree for the following sequence and write all the 3 traversal sequences from resultant BST: 45,39,56,12,34,78,32,10,89,54,67,81.	
C	Explain DFS and BFS.	

Q4. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Consider a hash table with size = 10. Using linear probing, insert the keys 27, 72, 63, 42,	

	36, 18, 29, and 101 into the table.
B	Create an AVL tree using the following sequence of data: 16, 27, 9, 11, 36, 54, 81, 63, 72.
C	Write a C functions to implement insertion and deletion in queue using linked list.