DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2024

DATA STRUCTURES

[Maximum Marks: **75**]   [Time: **3** Hours]

PART-A
I. Answer '*all*' the following questions in one word or one sentence. Each question carries '*one*' mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	Define Abstract Data Type (ADT).	M1.02	R
2.	Write the type of variable that stores the address of another variable.	M1.01	R
3.	The following sequence of operations is performed on the stack : push(1),push(2),pop, push(1),push(2). pop, pop, pop, push(2),pop The sequence of popped out values will be................	M1.05	U
4.	List two fields or parts of a node in a singly linked list.	M2.01	R
5.	List the primary operations in a queue data structure.	M2.04	R
6.	Construct a binary tree for the expression (a+b)*c	M3.03	U
7.	Define degree of a tree.	M3.01	R
8.	Define path and path length of graph.	M4.01	R
9.	Define a complete graph.	M4.02	R

PART-B
II. Answer any '*eight*' questions from the following. Each question carries '*three*' marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	Write a structure variable to store the details of student with Student name, register number and marks.	M1.01	U
2.	Compare linear and non-linear data structure.	M1.02	U
3.	Write an algorithm to examine whether the stack is full or empty.	M1.04	U
4.	Write an algorithm to print all the elements in a linked list.	M2.02	U
5.	Write an algorithm to insert an element to a queue.	M2.04	U
6.	Describe the advantages of using linked list over arrays.	M2.01	U
7.	Demonstrate inorder tree traversal algorithm.	M3.04	A
8.	Describe the terms: a) height of a tree b) Depth of a tree	M3.01	R
9.	Compare cyclic and acyclic graph.	M4.02	U
10.	Outline Warshall's algorithm.	M4.05	U

PART-C
Answer '*all*' questions from the following. Each question carries '*seven*' marks.

(6 x 7 = 42 Marks)

Module Outcome Cognitive level

		Module Outcome	Cognitive level
III.	Convert the following infix expression to postfix expression using stack: A+B-C*D. Explain the algorithm.	M1.05	A
	OR		
IV.	Define Stack. Give algorithm for PUSH and POP operations in array representation of Stack.	M1.04	A
			A
V.	Develop a program in C to search an element in a singly linked list.	M2.02	A
	OR		
VI.	Write an algorithm/program to sort an array of 'N' numbers using Bubble sort in ascending order.	M2.07	A
VII.	Write an algorithm/program to implement stack ADT using singly linked list.	M2.03	A
	OR		
VIII.	Write an algorithm/program to implement Binary search.	M2.06	A
IX.	Construct a Binary search tree by inserting values 50,25,70,80,10,60,30 in that order by placing value 50 as root of the tree. Outline the algorithm to insert a node in binary search tree.	M3.07	A
	OR		
X.	Demonstrate post order traversal algorithm with example.	M3.06	A
XI.	Explain the different types of trees in data structure.	M3.02	U
	OR		
XII.	Explain the linked list representation of a binary tree.	M3.03	U
XIII.	Explain any two types of representation of graphs.	M4.03	U
	OR		
XIV.	Illustrate Depth First Search with an example.	M4.04	A

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