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

DISCRETE MATHEMATICS

[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.	lf A has n elements then number of subsets of A =…………….	M1.01	R
2.	If p is a proposition $\neg(\neg p)$ =………………	M1.03	U
3.	nP_n =………………	M2.02	U
4.	If $|A|$ = m and $|B|$ = n then n(AxB) =………………	M2.02	R
5.	If f:A→B is a function from A to B then A is called……………..	M2.03	R
6.	A vertex which is not adjacent to every other vertex is called………....	M3.02	R
7.	A graph with p vertices and q edges is called………………	M3.02	R
8.	Every cyclic group is……………..	M4.01	R
9.	Every subgroup of a cyclic group is…………………	M4.01	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.	Find AUB and A∩B if A={2,4,7,8} and B={4,5,6,7 }.	M1.01	U
2.	Determine the truth value of conjunction table.	M1.03	U
3.	Write all subsets A={1,2,3}.	M1.01	U
4.	Find the number of permutations of the letters of the word INDEPENDENCE.	M2.02	U
5.	Let f:R→R where f(x)=3x+7 for all x ϵ R. Prove that f is one-one.	M2.03	U
6.	How many edges are there in a graph with 10 vertices each of degree 6?	M3.02	A
7.	Define trees and spanning trees.	M3.03	R
8.	Define pre-order traversal.	M3.03	U
9.	Define (i) semigroup (ii) monoid	M4.01	U
10.	Let A={a, b}. Draw the Hasse diagram of (p(A), ⊆) and check whether it is a lattice.	M4.02	U

PART-C
Answer *'all'* questions from the following. Each question carries *'seven'* marks.
(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Draw appropriate Venn diagram for each of the following. (i) $(A \cup B)^1$ (ii) $A^1 \cap B^1$	M1.01	A
	OR		
IV.	If A and B are two sets such that $A \cup B$ has 50 elements. A has 28 elements and B has 32 elements. How many elements does $A \cup B$ have?	M1.01	A
V.	Construct truth table for the compound statement $\neg (_p v_q) \to \neg p$.	M1.03	U
	OR		
VI.	Use truth table $\neg (p \to q) \to \neg q$ is a logical implication.	M1.03	U
VII.	Let * be a binary operation on the set N of natural numbers defined by the rule $a*b = ab/4$ for all $a,b \in N$. Is * a) Commutative b) Associative.	M1.02	U
	OR		
VIII.	Show that the function $f:N \to N$ given by $f(x)=2x$, is one -one and onto.	M2.03	U
IX.	An undirected graph has an even number of vertices of odd degree.	M3.02	U
	OR		
X.	Show that the size of every graph of order n is atmost $n(n-1)/2$?	M3.02	U
XI.	Prove that every connected graph G has a spanning tree?	M3.03	U
	OR		
XII.	Prove that the sum of degree of all vertices in G equal to twice the number of edges.	M3.02	U
XIII.	Show that A= {l, -1, i,-I} is a group under multiplication.	M4.01	U
	OR		
XIV.	Show that the set of integers under addition is a group.	M4.01	U

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