Enroll No..... Roll No.....

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Even Semester Examination-2023

Paper Name: Discrete Mathematics
Time: 3 Hours

Paper Code: BTCSE-401 (Lateral)
Maximum Marks: 75

Note: Mobile Phones or programmable calculator or any equipment with memory are not allowed inside the examination hall. Follow proper numbering for answering the questions.

Attempt all questions from section A (7*5=35), Any four questions from section B (4*10=40).

Section-A (Attempt all questions 7*5=35)

Q.N.	Questions	Marks	CO	BL
1	Define Subgraphs. What are the different kinds of subgraphs.	5	CO5	L1
2	If $f : R \to R$ *and* $g : R \to R$ defined $f(x) = x^2$ and $g(x) = \sin(x)$, for all x in R, show that $gof \neq fog$.	5	CO1	L5
3	If ${}^{2n+1}P_{n-1} : {}^{2n-1}P_n = 3:5$. Find the value of n.	5	CO2	L4
4	Show that the union of two subgroups is not necessarily a subgroup.	5	CO4	L1
5	Write a note on colouring of graphs.	5	CO5	L1
6	Check whether the following proposition is a tautology or not. $((p \to q) \to r) \leftrightarrow ((p \leftrightarrow r) \vee (q \to r))$	5	CO3	L3
7	Two operations * and o on the set Z of integers are defined as follows: a * b = a + b - 1, a o b = a + b - ab. Prove that (Z, * ,o) is a commutative ring.	5	CO4	L5

Section- B (Attempt any four questions 4*10=40Marks)

Q.N.	Questions	Marks	CO	BL
1	Define a tree. Explain the difference between rooted tree and binary tree.	10	CO5	L1
2	Show that the relation **R** on the set of all triangles in the plane defined by **R** = { (a,b) : triangle a is similar to triangle b} is an equivalence relation.	10	CO1	L4
3	How many people at least in a group of 85 people have the same initials.	10	CO2	L3

4	Find the product of two permutations and show that it is not commutative. $f=\begin{pmatrix}1&2&3&4\\2&1&4&3\end{pmatrix}$ *and* $g=\begin{pmatrix}1&2&3&4\\3&2&1&4\end{pmatrix}$	10	CO4	L5
5	Find the truth value of the following: $(p \wedge q) \rightarrow (\sim p \vee \sim q)$	10	C03	L5
6	Three men have 4 coats, 5 waistcoats and 6 caps. In how many ways can they wear them ?	10	CO2	L3

BL-Bloom's Taxonomy Levels

(1. Remembering, 2. Understanding, 3. Applying, 4. Analysing, 5. Evaluating, 6. Creating.)