Enrollment Number: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B. TECH MIDSEM EXAMINATION
3rd SEMESTER
ACY-2022-23 (ODD SEM)

Subject Name (Code): Discrete Mathematics(203191206)
Branch: CSE/IT
Date:09/08/2022 **Time: 2:30PM to 4:00PM** **Total Marks: 40**

Sr. No.		Marks
Q.1	**(A) One line Questions**	05
1	Truth value of $F \rightarrow T$ =_____.	
2	$p \wedge p = p$ *is known as*_____*Law.*	
3	n(A) =2 And n(B) =3 then total number of non-trivial relations from A to B is _____	
4	If an algebraic structure satisfies associative and existence of identity property then it is known as _____.	
5	State the Fundamental Theorem Of Arithmetic.	
Q.1	**(B) Compulsory Question**	05
1	Identity relation on any set is always reflexive**[true/false]**	
2	Subtraction is binary operation on $\mathbb{N}$.**[true/false]**	
3	$\sqrt{31}$ is _____ number.	
4	Euclidean algorithm is used to find _____ of two numbers.	
5	If the relation is reflexive then diagonal entry s of Metrix representation must be_____	
Q.2	**Attempt any four (Short Questions)**	12
1	Determine whether the compound propositions is satisfiable or not $(p \wedge q) \vee (\neg p \wedge \neg q)$	
2	R={(1,1),(1,2),(2,1),(3,2)} be the relation on A={1,2,3} then find Reflexive closure ,symmetric closure, And Transitive closure.	
3	Write the converse ,inverse and contrapositive of the following statement "If the weather is nice, then I'll wash the car."	
4	Let R and S be relations on a set A represented by the matrices $M_R = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ and $M_S = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$. Find the matrices representing the following relations. (a) $R \cup S$ (b) $R \cap S$ (c) $S \circ R$ (d) $R \circ S$ (e) $R \oplus S$	
5	Show that $(\mathbb{Z}, \times)$ *is monoid.*	
Q.3	**Attempt any two**	08
1	Check whether the $(\mathbb{Z}, \geq)$ *is partially* ordered relation or Not.	

2 By using the method of Contradiction show that $3+\sqrt{2}$ is irrational.

3 Using the concept of mathematical induction show that $1^3+2^3+3^3+\cdots\ldots+n^3=\frac{(n(n+1))^2}{4}$

Q.4 a) Show that $((p \vee q) \wedge (\neg p \vee r)) \rightarrow (q \rightarrow r)$ is Tautology. 05

b) Show that $(\mathbb{R},+)$ is Abelian Group. 05

OR

Let A={1,2,3,4} and R={(1,2)(2,4)(2,2)(2,3)(2,3),(1,1)(2,1)(4,2)} 05

i) Draw the diagraph of the above relation

ii) Write Matrix Representation Of above relation

iii) Check that the relation is equivalence or not.