Second Year B. TECH. (Computer Science and Engineering)

MSE , ODD SEMESTER, AY 2022-23

Discrete Mathematics (6CS201)

MSE

Day, Date and Time: Tuesday, 11/10/2022, 03.00 pm to 04.30 pm

PRN: _____

Max Marks: 30

IMP: Verify that you have received question paper with correct course, code, branch etc.

Instructions: a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
e) Mobile phones and programmable calculators are strictly prohibited.
f) Except PRN anything else writing on question paper is not allowed.
g) Exchange/Sharing of stationery, calculator etc. not allowed.

Text on the right of marks indicates course outcomes (only for faculty use).

			Marks	
Q1	A)	Prove the logical equivalance by using rules of logical equivalance 1. $(p \wedge q) \vee (\sim p \wedge q) \vee (\sim q \wedge r) = q \vee r$ 2. $\sim p \wedge q \equiv (p \vee q) \wedge \sim p$	5	CO2
Q1	B)	Define the following terms with the help of a proper example: 1.Antisymmetric Relation 2.Transitive Relation 3.Partition and covering of a set 4.Difference of a set (Relative complement) 5.Asymmetric Relation	5	CO1
Q2	A)	Obtain the following normal forms:	5	CO2

1) Disjunctive Normal form of
$(P \vee (\sim P \rightarrow (Q \vee (Q \rightarrow \sim R))$

2) Principal Disjunctive Normal form of
$Q \vee (P \vee \sim Q)$

Q2 B) Solve the following: 5 CO1

1.State the Converse, inverse and contrapositive of the following statement: "If surface area decreases then the pressure increases"

2.Find the truth value of: 14 is a composite number or 15 is a prime number

3.If p: It is daytime, q: It is warm

Give the compound statement denoted by:

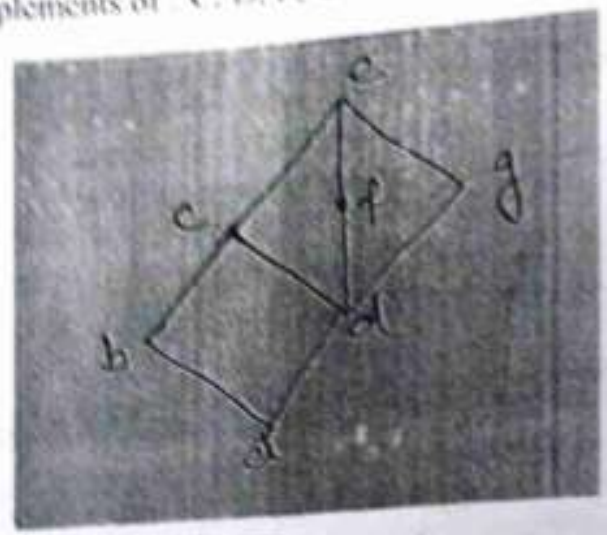
i. $p \wedge \sim q$

ii. $p \vee q$

iii. $p \rightarrow q$

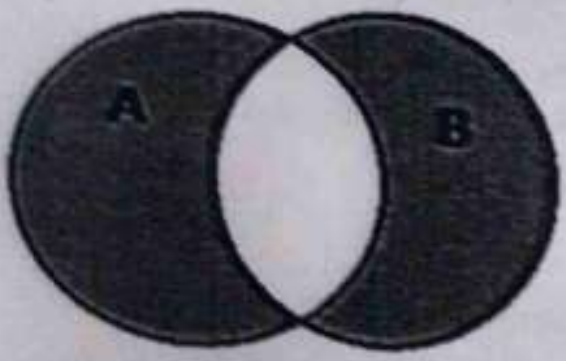
iv. $q \leftrightarrow p$

Q3 A) Check if the following is a lattice or not. Justify your answer. 5
Also find out the complements of : C, D, F, G



Q3 B) Solve the following and **justify your answer for each in short :** 5

1. The relation $<$ on a set of real number is
A) Reflexive B) Irreflexive C)Symmetric D) None
2. Which of the following is not a set?
A)The collection of all girls in the class
B)The collection of all boys greater than age 10 years
C)The pair of shoes
D)Group of all intelligent girls and boys in a class
3. If $A=\{\Phi, \{\Phi\}\}$, then power set of A is .....
4. The shaded area in the figure is described by .....



5. $A \rightarrow (A \vee q)$ is a _____
A. Tautology B .Contradiction C . Contingency D None