ACE Engineering College
(with a Difference in Excellence)
An AUTONOMOUS Institution

Question Paper Code: CS301PC | ACE-R20

Semester Supplementary Examination
II B. Tech- I Semester- SEPTEMBER-2022
DISCRETE MATHEMATICS
(COMMON TO CSM, CSD,CSO)

Time: 3 Hours **Max. Marks: 70**

H. T. No										

*Answer any 5 **Questions** out of 8 **Questions** from the following*
M=Marks

Q.No	Question	M
1. a)	Write the following statements in symbolic form or closed form. i) All monkeys have tails ii) No monkey has a tail. iii) Some monkeys have tails	2+2+2
b)	Use Truth table to verify the distributive law of $P \wedge (Q \vee R)$	8
2. a)	Test the validity of statements using rules of Inference	
	$P \vee Q$ $P \rightarrow R$ $Q \rightarrow S$ --- $S \vee R$ ---	7
2.b)	Show that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$	7
3.	Define Equivalence relation. Let R be relation on NXN which is defined by (a,b) R (c,d) iff ad = bc. Prove that R is an equivalence relation.	14
4. a)	a) Draw the Hasse diagram representing the positive divisors of 36.	7
b)	a) If R is a relation on the set A = {1, 2, 3, 4} defined by x R y if "x exactly divides y" .Prove that (A, R) is a poset.	7
5. a)	Use Mathematical Induction to show that $1 + 2 + 2^2 + \ldots\ldots\ldots + 2^n = 2^{n+1} - 1$	7
b)	Give a recursive algorithm for computing the G.C.D. of two non negative integers a and b with a < b with two examples	7

6.	Solve the recurrence relation $a_{n+2} - 6a_{n+1} + 9a_n = 3 \cdot 2^n + 7 \cdot 3^n$ for $n \geq 0$; $a_0 = 1, a_1 = 4$	14
7. a)	Find the generating function of the sequence i) $\{a_n\} = \{\frac{1}{n!}\}$ ii) $(2 + x)^3$	3 + 3
b)	Define isomorphism of graphs. What are the steps followed in discovering the isomorphism .	8
8. a)	Define the following i) Cut edge ii) Cut vertex iii) Cycle, Circuit iv) Spanning tree With suitable examples	3+3+3+3
b)	Write about Planar graph.	2