Q.P. Code: 20HS0836 **R20**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

MCA I Year I Semester Supplementary Examinations November-2021

DISCRETE MATHEMATICS

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	**a**	Explain the difference between the principle disjunctive and conjunctive normal form.	**L2**	**6M**
	b	Define NAND, NOR & XOR and give their truth table	**L1**	**6M**
		OR		
2	**a**	Use indirect method of proof to prove that $(\forall x)(P(x) V Q(x) \Rightarrow (\forall x)P(x) V (\exists x)Q(x)$	**L2**	**6M**
	b	Define Quantifiers and types of Quantifiers with examples	**L1**	**6M**

UNIT-II

3	**a**	What is a compatability relation? Explain the procedure to find the maximal compatibility blocks.	**L1**	**6M**
	b	Verify f(x)=2x+1, g(x)=x for all xϵR are bijective from R to R	**L4**	**6M**
		OR		
4	**a**	Define group, sub group, homomorphism and isomorphism	**L2**	**6M**
	b	Prove that the set Z of all integers with the binary operation * defined as a*b=a+b+1, for all a, b ϵZ is an abelian group.	**L1**	**6M**

UNIT-III

5		Out of 5 men and 2 women, a committee of 3 is to be formed. In how many ways can be formed if atleast one woman is to be included?	**L4**	**12M**
		OR		
6	**a**	How many ways can we get a sum of 8 when two indistinguishable dice are rolled?	**L4**	**6M**
	b	Applying pigeon hole principle show that of any14 integers are selected from the set S={1,2,3,…..,25}there are atleast two whose sum is 26.Also write a statement that generalizes this result.	**L2**	**6M**

UNIT-IV

7	**a**	Determine the coefficient of x^{20} *in* $(x^3 + x^4 + x^5 + ...)^5$	**L3**	**6M**
	b	Solve $a_{n+2} - 5a_{n+1} + 6a_n = 2$ with the initial conditions a_0=1,a_1= -1	**L6**	**6M**
		OR		
8		Solve $a_n - 4a_{n-1} + 4a_{n-2} = (n+1)^2$ given a_0=0,a_1=1	**L6**	**12M**

UNIT-V

9	**a**	State Euler's formula and Handshaking theorem	**L1**	**6M**
	b	Define Isomorphism. Explain Isomorphism of graphs with suitable example.	**L1**	**6M**
		OR		
10	**a**	Show that in any graph the number of odd degree vertices is even	**L5**	**6M**
	b	Explain about the Rooted tree with an example?	**L5**	**6M**

*** END ***