Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
MCA I Year I Semester Regular Examinations July- 2021
DISCRETE MATHEMATICS

Time: 3 hours   Max. Marks: 60

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

UNIT-I

1	**a**	What is logical equivalence? Explain with an example.	L1	**6M**
	b	Construct the truth table to show that $\neg p \wedge (Q \wedge P)$ is a contradiction.	L6	**6M**

OR

2	**a**	Show that $P \vee Q$ *follows from* P.	L2	**6M**
	b	Define Maxterms and Minterms of P & Q and give their truth tables.	L1	**6M**

UNIT-II

3	Let A={1,2,3,4} and let R={(1,1),(1,2),(2,1),(2,2),(3,4),(4,3),(3,3),(4,4)} be an equivalence relation on R. Determine A/R.	L3	**12M**

OR

4	**a**	If $f : A \to B, g : B \to C, h : C \to D$ then prove that ho(gof)=(hog)of	L2	**6M**
	b	Show that the binary operation * defined on (R,*) where $x*y=x^y$ is not associative.	L2	**6M**

UNIT-III

5	**a**	Explain Pigeon hole principle and give an example.	L2	**6M**
	b	Find how many integers between 1 and 60 that are divisible by 2 nor by 3 and nor by 5. Also determine the number of integers divisible by 5 not by 2, not by 3.	L5	**6M**

OR

6	**a**	Find the coefficient of (i) $x^3 y^2 z^2$ in $(2x-y+z)^9$ (ii) $x^2 y^4$ in $(x-2y)^6$	L3	**6M**
	b	Find the minimum number of students in a class to be sure that 4 out of them are born on the same month?	L5	**6M**

UNIT-IV

7	**a**	Determine the sequence generated by i) $f(x) = 2 e^x + 3 x^2$ ii) $f(x) = e^{8x} - 4 e^{3x}$	L6	**6M**
	b	Solve $a_n = a_{n-1} + 2a_{n-2}, n \geq 2$ with initial condition $a_0=0$, a1=1.	L6	**6M**

OR

8	Solve $a_n - 5a_{n-1} + 6a_{n-2} = 2^n$, $n \geq 2$ with initial conditions $a_0=1$, a1=1, using generating functions.	L6	**12M**

UNIT-V

9	**a**	Define Spanning tree and Hamiltonian graph.	L1	**6M**
	b	Show that the maximum number of edges in a simple graph with n vertices is $\dfrac{n(n-1)}{2}$	L2	**6M**

OR

10	Explain Depth-First-Search, Breadth-First-Search Algorithm.	L2	**12M**

*** END ***