Q.P. Code: 18HS0836 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations February-2022

DISCRETE MATHEMATICS

(Common to CSE & CSIT)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	Define tautology with examples.	**2M**
	b	Define semi group with example	**2M**
	c	State Binomial Theorem.	**2M**
	d	) Find the generating function for the sequence 1, 2, 3, 4…	**2M**
	e	State Eulers formula.	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	**a**	Define Quantifiers and types of Quantifiers with examples.	**5M**
	b	Show that $S \vee R$ is a tautologically implied by $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$	**5M**

OR

3	**a**	Construct the truth table for the following formula $\neg(\neg P \vee \neg Q)$	**5M**
	b	Construct the truth table to Show that $\neg P \wedge (Q \wedge P)$ is a contradiction.	**5M**

UNIT-II

4		Let A be a given finite set and P(A) its power set . let $\subseteq$ be the inclusion relation on the elements of P(A) .Draw the Hass diagram of (P(A) , $\subseteq$) for i) A = { a } ii) A ={ a ,b} iii) A = { a,b,c } iv) A = { a,b,c,d }.	**10M**

OR

5	**a**	Define and give examples for group, semigroup, subgroup &abelian group.	**5M**
	b	Define a binary relation. Give an example. Let R be the relation from the set A = {1, 3, 4} on itself and defined by R = { (1, 1), (1, 3), (3, 3), (4, 4)} the find the matrix of R draw the graph of R.	**5M**

UNIT-III

6	**a**	Show that if 8 people are in a room, at least two of them have birthdays that occur on the same day of the week.	**5M**
	b	How many permutations can be formed out of the letters of word "SUNDAY"? How many of these (i) Begin with S? (ii) End with Y? (iii) Begin with S & end with Y? (iv) S &Y always together?	**5M**

OR

7	**a**	How many numbers can be formed using the digits 1, 3, 4, 5, 6, 8 and 9 if no repetitions are allowed?	**6M**
	b	How many integral solutions are there x1+x2+x3+x4=20, where each(i) $x_i \geq 2$ (ii) $x_i > 2$	**4M**

UNIT-IV

8	**a**	Solve the recurrence relation $a_r=a_{r-1}+a_{r-2}$ using generating function	**6M**
	b	Solve $a_n=3a_{n-1}-a_{n-2}$ with initial condition $a_1=1.5$ and $a_2=3$	**4M**

OR

9	**a**	Solve $y_{n+2}-y_{n+1}-2y_n=n^2$	**5M**
	b	Solve $a_n-4a_{n-1}+4a_{n-2}=(n+1)^2$ given $a_0=1$, $a_1=1$	**5M**

UNIT-V

10	**a**	Explain about complete graph and planar graph with an example	**5M**
	b	Explain graph coloring and chromatic number give an example	**5M**

OR

11	**a**	Explain In degree and out degree of graph. Also, explain about the adjacency matrix representation of graphs. Illustrate with an example.	**5M**
	b	Explain about the Rooted tree with an example.	**5M**

END