SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
Coimbatore – 641 035.
Internal Assessment -I
Academic Year 2023-2024(ODD)
Fifth Semester
19MAT301 – DISCRETE MATHEMATICS
(REGULATION 2019)
(Common to CSE,IT & AIML)

A

Time: 1.30 Hours   **Maximum Marks: 50**

ANSWER ALL QUESTIONS
PART A — (5 x 2 = 10 Marks)

PART – A (5 x 2 = 10 MARKS)
ANSWER ALL QUESTIONS

		CO	BLOOMS
1.	Find the truth table for the statement $p \rightarrow q$.	CO1	(Und)
2.	Give the Contrapositive statement of the proposition " If tigers have wings, then the earth travels around the sun".	CO1	(Und)
3.	Define Tautology.	CO1	(Rem)
4.	State the Principle of Mathematical Induction.	CO2	(Rem)
5.	Show that if seven colours are used to paint 50 bicycles, atleast 8 bicycles will be the same colour.	CO2	(App)

PART – B (13+13+14= 40 MARKS)
ANSWER ALL QUESTIONS

			CO	BLOOMS
6.	a) i)	Construct the truth table for the expression $\neg(P \wedge Q) \leftrightarrow (\neg P \vee \neg Q)$.	CO1	(App) (6)
	ii)	Obtain the PDNF of $(P \wedge Q) \vee (7P \wedge R) \vee (Q \wedge R)$.	CO1	(App) (7)

(or)

			CO	BLOOMS
	b) i)	Check the following proposition $((P \rightarrow Q) \rightarrow R) \vee \neg P$ is a tautology.	CO1	(App) (6)
	ii)	Show that $R \rightarrow \neg Q, \ R \vee S, \ S \rightarrow \neg Q, \ P \rightarrow Q \Rightarrow \neg P$ by indirect method.	CO1	(App) (7)

7. a) Obtain the PCNF of $(\neg P \rightarrow R) \wedge (Q \leftrightarrows P)$ and also find its PDNF.   CO1 (App) (13)

(or)

b) i) Use Mathematical Induction to prove that $8^n - 3^n$ is a multiple of 5.   CO2 (Ana) (7)

ii) Suppose there are 6 boys and 4 girls.   CO2 (App) (6)

    (i) In how many ways can they sit in a row?

    (ii) In how many ways can they sit in a row if they boys and the girls each sit together?

    (iii) In how many ways can they sit in a row if the girls can sit together?

8 a) i) Show that the premises " One student in this class knows how to write programs in JAVA" and " Everyone who knows how to write programs in JAVA can get a high paying job" imply the conclusion "Someone in this class can get a high paying job".   CO1 (Ana) (7)

ii) Prove that the premises $P \rightarrow Q, \; Q \rightarrow R, S \rightarrow \neg R$ and $P \wedge S$ are inconsistent.   CO1 (App) (7)

(or)

b) i) Prove that $1 + 2 + 3 + \cdots + n = \dfrac{n(n+1)}{2}$ by Mathematical Induction.   CO2 (App) (7)

ii) A box contains 6 white balls and 5 red balls .Find the number of ways four balls can be drawn from the box if   CO2 (Ana) (7)

    (i) They can be any colour

    (ii) Two must be white and two red

    (iii) They must all be the same colour.

Rem/Und: Remember/ Understand   **App:** Apply   **Ana** : Analyze   **Eva :** Evaluate   **Cre** : Create

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