GALGOTIAS UNIVERSITY

ADMISSION NUMBER												

School of Basic Sciences

Bachelor of Science Honours in Mathematics
Mid Term Examination - Mar 2024

Duration : 90 Minutes
Max Marks : 50

Sem VI - C1UC603T - Discrete Mathematics and Graph Theory

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	Estimate the truth tables for. (a) p ∨ ¬q	K2	(2)
2)	**Find** the truth value of each of these statements if the domain consists of all integers. **a)** $\forall n(n + 1 > n)$ **b)** $\exists n(2n = 3n)$	K1	(3)
3)	Show that the proposition p ∨ ¬ (p ∧ q) is a tautology.	K2	(4)
4)	Explain, how many people are required, such that there must be at least two with the same birthday.	K2	(6)
5)	Apply basic logics to show that each of these conditional statements is a **tautology** by using truth tables. **a)** $(p \wedge q) \rightarrow p$ **b)** $p \rightarrow (p \vee q)$ **c)** $\neg p \rightarrow (p \rightarrow q)$	K3	(6)
6)	Develop the Disjunctive Normal Form (DNF) of $(\neg p \rightarrow q) \wedge (p \leftrightarrow q)$	K3	(9)
7)	Let *p* and *q* be the propositions *p* : I bought a lottery ticket this week. *q* : I won the million dollar jackpot Express each of these propositions as an English sentence. **a)** $\neg p$ **b)** $p \vee q$ **c)** $p \rightarrow q$ **d)** $p \wedge q$ **e)** $p \leftrightarrow q$ **f)** $\neg p \rightarrow \neg q$ **g)** $\neg p \wedge \neg q$ **h)** $\neg p \vee (p \wedge q)$	K4	(8)
8)	Show that “If 3n+2 is odd, then n is odd” by direct proof.	K4	(12)
	OR		
	Show that $\sqrt{2}$ is irrational by giving a proof by contradiction.	K4	(12)