GALGOTIAS UNIVERSITY

ADMISSION NUMBER												

School of Basic Sciences

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

Duration : 90 Minutes
Max Marks : 50

Sem IV - C1UC404T - Algebra

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)	Explain the synthetic division method using an example.	K2	(2)
2)	Find the remainder obtained by dividing 1!+2!+3!+4!+…..+100! by 12.	K1	(3)
3)	Show that cube of any integer is either of the form 9k, 9k+1 or 9k+3.	K2	(4)
4)	Show that a function f is invertible if and only if it is one-one and onto.	K2	(6)
5)	Solve the linear congruence $12x \equiv 6 \bmod 9$, if possible	K3	(6)
6)	Find a necessary and sufficient condition for the roots of the equation $x^3 - px^2 + qx - r = 0$ to be in (i) A.P., (ii) G.P., (iii) H.P.	K3	(9)
7)	Conclude that if $ca \equiv cb \bmod n$, then $a \equiv b \bmod \frac{n}{d}$.	K4	(8)
8)	1. Let A1 = {2, 3}, A2 = {1, 5, 6}, and A3 = {4} form the partition of A = {1, 2, 3, 4, 5, 6}. Construct an equivalence relation corresponding to the above partition. 2. If f = (1 2 4) (3 5), g = (1 2 3 5), find $f^2, g^2, (fg)^{-1}, g^{-1}f^{-1}$.	K4	(12)
	OR		
	1. Find the remainder when the 4165 is divided by 7. 2. Find all the non-congruent positive solutions of $9x \equiv 11 \bmod 85$.	K4	(12)