

Reg. No.:



Name:

University of Kerala

W7648

First Semester FYUGP Degree Examination, December 2025

Discipline Specific Core Course

MATHEMATICS

UK1DSCMAT100 - Foundations of Mathematics

Academic Level: 100-199

2025-Admission

Time: 1 Hour 30 Minutes(90 Mins.)

Max. Marks: 42

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark
Each.Answer all questions

Qn No.	Question	CL	CO
1	In the statement, "There is a rotten apple in the basket," what type of quantifier is involved?	RE	1
2	Define elementary matrix.	RE	1
3	Give an example for a compound statement.	UN	1
4	Determine whether the matrix is in row echelon form, reduced row echelon form or neither: $\begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$	UN	2
5	State Pigeonhole Principle.	UN	3
6	State True or False: Every composite number has a prime factor.	UN	3

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Write the sentence "Every tree in this campus has at least one brown leaf" using " $\forall$ " and " $\exists$ " in appropriate place.	UN	3
8	$\begin{bmatrix} -5 & 1 \\ 1 & 0 \end{bmatrix}$ Determine whether the matrix is an elementary matrix?.Give reason.	UN	2
9	Show that the product of any two integers of the form $4n + 1$ is also of the same form.	AP	3

Qn No.	Question	CL	CO
10	Give a counter example to disprove the following statement. "For any $x \in \mathbb{R}$, $x^2 \geq x$ ".	AP	1

Part C. 28 Marks. Time: 60 Minutes (Cognitive Level: Apply (AP)/Analyse (AN)/Evaluate (EV)/Create (CR)) Long Answer. 7 marks each. Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A) State the inclusion–exclusion Principle and using it find the number of positive integers ≤ 3000 and divisible by 3, 5, or 7 . OR B) Find (12, 18, 28), (12, 36, 60, 108) and (15, 28, 50)	AP	3, 3
12	A) Using the inversion algorithm find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{bmatrix}$ OR B) State and prove The Fundamental Theorem of Arithmetic	AN	3, 3
13	A) For given sets A and B, prove that the following are equivalent. (i) $A \subseteq B$. (ii) $A \cap B = A$. (iii) $A \cup B = B$ OR B) Find the number of positive integers ≤ 3076 and 1. divisible by 23 2. not divisible by 24	EV	1, 3
14	A)	CR	2, 2

Qn No.	Question	CL	CO
	Suppose you are asked to find three real numbers such that the sum of the numbers is 12, the sum of two times the first plus the second plus two times the third is 5, and the third number is one more than the first. Find a linear system whose equations describe the three conditions. Find the three numbers. OR B) Every integer $n \geq 2$ has a prime factor		