

Reg. No.:



Name:

University of Kerala

W7469

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	Define a homogeneous system of linear equations.	RE	2
2	State Well-Ordering Principle.	RE	2
3	Write the negation of the statement "For each book in the library, if it has a preface, then it has a bibliography".	UN	1
4	State Fundamental theorem of arithmetic.	UN	2
5	"Is every prime number odd?" State whether the statement is true or false and justify it by giving an example or proof.	UN	3
6	When did you say that two positive integers a and b are relatively prime.	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 necessary part and sufficient part of the statement: The apple is ripe if and only if it is red	UN	3
8	Compute the gcd of 120 and 28.	UN	2
9	$\begin{pmatrix} 1 & 3 \\ 2 & 7 \end{pmatrix}$ Find the row echelon form of	AP	2

Qn No.	Question	CL	CO
10	Prove that if p is a prime and $p ab$, then $p a$ or $p b$.	AP	3

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) Find the canonical decomposition of 2520. Also draw the factory tree of 2520. OR B) State and prove The Division algorithm	AP	3, 3
12	A) Prove that there are infinitely many primes of the form $4n + 3$ OR B) State and prove the Fundamental Theorem of Arithmetic.	AN	3, 3
13	A) Using mathematical induction prove that $\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$ OR B) Using Euclidean algorithm find $(4076, 1024)$ and express $(4076, 1024)$ as a linear combination of 4076 and 1024.	EV	3, 3
14	A) What condition, if any, must a, b, and c satisfy for the following linear system to be consistent? $x + 3y + z = a$ $-x - 2y + z = b$ $3x + 7y - z = c$ OR B) Prove that every non empty set of non negative integer has a least element	CR	2, 2