

Reg. No.:



W6871

Name:

University of Kerala
Third Semester FYUGP Degree Examination, November 2025

Discipline Specific Core Course

MATHEMATICS

UK3DSCMAT209-Mathematics in Social Science - III

Academic Level: 200-299

2024 Admission

Time: 2 Hours (120 Mins.)

Max. Marks: 56

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	Evaluate $\int \sin x dx$	RE	1
2	Find order and degree of $x \frac{d^2 y}{dx^2} + 5(x + y) \frac{dy}{dx} + 3xy = x^2$	RE	3
3	Give an example of a linear differential equation	UN	2
4	Find $\frac{d}{dx}(x^2 + 2xy)$	UN	1
5	Find $\int \frac{1}{x^4} dx$	UN	2
6	Solve $\frac{d^2 y}{dx^2} = e^{-x}$	UN	4

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	Evaluate $\int 7x^2 dx$	UN	1
8	Find $\frac{\partial f}{\partial x}$ if $f = 4x^2 + 4xy + y^2$	UN	1

Qn.No.	Question	CL	CO
9	Evaluate $\int 3^x dx$	AP	1
10	Find cross partial derivative of the function $z = x^3 e^{2y}$.	AP	3
11	Develop the general solution of the differential equation $\frac{dy}{dx} = \frac{x+1}{2-y} \quad (y \neq 2)$	AP	2

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
12	A) Find $\int \frac{1}{x+2} dx$. OR B) Find first and second order partial derivatives of $Z = x + ye^{-x}$	AP	1
13	A) Evaluate $\int_0^5 xe^x dx$ OR B) Show that $y = 2cx^2 + c^2$ is the solution of the equation $\left(\frac{dy}{dx}\right)^2 + 8x^2 \frac{dy}{dx} = 16x^2 y$	AP	2
14	A) Verify $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$, where $Z = x + ye^x$	AN	1

Qn.No.	Question	CL	CO
	OR B) Solve the second order differential equation $\frac{d^2y}{dx^2} + y = 0$		
15	A) Solve the differential equation $\frac{dy}{dx} + xy = x$. OR B) Find the general solution of the differential equation: $2\frac{dy}{dx} + 4y = 6$. Also find the definite solution for $y(0) = 1$.	AN	2

Part D 24 Marks. Time: 60 Minutes. (Cognitive Level : Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer 6 Marks each. Answer all 4 questions choosing among options * within each question

Qn.No.	Question	CL	CO
16	A) Solve $\cos^2 x \frac{dy}{dx} + y = \tan x$ OR B) Find the general solution of the differential equation $2\frac{dy}{dx} + 10y = 15$. Also find the definite solution for $y(0) = 0$.	AN	2
17	A) (a) $\int (x^2 + \frac{1}{3\sqrt{x}})^2 dx$ (b) $\int \frac{1 - \sin^3 x}{\sin^2 x} dx$	EV	4

Qn.No.	Question	CL	CO
	OR B) 1. Solve $\frac{1+x^2}{1+y^2} = xy \frac{dy}{dx}$ 2. Solve $dy + (4xy - 4x)dx = 0$		
18	A) (i) Check whether $y^2 = cx + \frac{1}{8}c^3$ is a solution of $y = 2x \frac{dy}{dx} + y^2 \left(\frac{dy}{dx}\right)^3$. (ii) Solve the differential equation $(x^2 - yx^2) \frac{dy}{dx} + y^2 + xy^2 = 0$. OR B) Find all second order partial derivatives of $z = \frac{x^3 + y^3}{x^2 + y^2}$.	EV	4
19	A) (i) Solve $y'' + 5y' + 4 = x^2 + 7x + 9$. (ii) Solve $y'' - y' = 3e^{2x}$. OR B) Find the area above the x-axis bounded by $y = 4x - x^2 - 3$, $x = 1$ and $x = 3$.	CR	4