

Reg. No.:



Name:

University of Kerala

U8765

Second Semester FYUGP Degree Examination, April 2025

Discipline Specific Core Course

MATHEMATICS

UK2DSCMAT108 - Integral Calculus and Series

Academic Level: 100-199

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 sequence.	RE	3
2	Write the Maclaurin's series expansion of $\sin x$.	RE	5
3	$\int x^2 dx = \dots$	UN	1
4	Determine whether the sequence $\{8 - 3n\}$ converges or diverges.	UN	4
5	Evaluate $\int \sin 7x dx$.	UN	1
6	Give an example of a strictly increasing sequence.	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	State ratio test of series.	UN	4
8	Evaluate $\int \frac{1}{2x} dx$.	UN	1
9	Find the rational number represented by the repeating decimal 0.784784784...	AP	3
10	Use substitution to evaluate $\int \frac{3x^2}{x^3 + 5} dx$.	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) Find the Maclaurin polynomials p_0, p_1, p_2, p_3 and p_n for e^x. OR B) Find the volume of the Solid generated when the region R in 1st quadrant enclosed between $y = x$ and $y = x^2$ is revolved about (i) x-axis and (ii) y-axis.	AP	5, 2
12	A) Derive the formula for the volume of a right pyramid whose altitude is h and whose base is a square with sides of length a. OR B) Find the area of the region enclosed by $y = x^2$ and $y = x + 3$.	AN	2, 1
13	A) Find the interval of convergence of the series $\sum_{k=1}^{\infty} 3^k x^k$. OR B) Evaluate (a) $\int_0^{\pi/8} \sin^5 2x \cos 2x \, dx$. (b) $\int_2^4 (2x - 5)(x - 5)^9 \, dx$.	EV	5, 1
14	A) Sketch the graph of $r = a(1 - \cos \theta)$ where $a > 0$. OR B) Sketch the region enclosed by the curves $y = x^2, y = \sqrt{x}$ from $x = \frac{1}{4}$ to $x = 1$ and find the area between the curves.	CR	4, 2