



# PRESIDENCY UNIVERSITY

BENGALURU

Roll No.														
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## Make-Up Examinations – December 2025

Date: 29 -12-2025

Time: 09:30am – 12:30pm

School: SOCSE	Program: BCA		
Course Code : MAT2007	Course Name : APPLIED MATHEMATICS		
Semester: MK	Max Marks: 100	Weightage: 50%	

CO - Levels	C01	C02	C03	C04
Marks	34	54	58	34

### Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

### Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1	Let $A = \begin{bmatrix} 2 & 4 \\ 5 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & -5 \\ 0 & 2 \end{bmatrix}$ , Find $AB$ .	2 Marks	L1	C04
2	Describe symmetric and skew-symmetric matrices.	2 Marks	L1	C04
3	If either vector $a = 0$ or $b = 0$ , then $a \cdot b = 0$ . But the converse need not be true. Justify your answer with an example.	2 Marks	L1	C01
4	If the direction ratios of a line are $(3, 4, 0)$ , identify its direction cosines.	2 Marks	L1	C01
5	Identify the derivative of $f(x) = \cot^2 x$ ?	2 Marks	L1	C02
6	Identify the derivative of $4e^x + 2 \log x$ .	2 Marks	L1	C02
7	Identify the derivative of $f(x) = 3\sqrt{x} - \frac{5}{x}$ ?	2 Marks	L1	C02
8	Compute $\int \left(x - \frac{4}{1+x^2}\right) dx$ .	2 Marks	L1	C03
9	Compute $\int \left(\frac{1-\sqrt{x}}{x}\right) dx$ .	2 Marks	L1	C03

10	Compute $\int e^{\log(1+\tan^2 x)} dx$ ?	2 Marks	L1	C03
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### Part B

Answer the Questions

Total 80 Marks.

11.	a.	Estimate the shortest distance between $r = (-3i + k) + \lambda(-5i + j + 7k)$ and $r = (3j + 5k) + \mu(5i + 2j - k)$ .	10 Marks	L3	C01
	b.	Find the vector equation and the cartesian form of the line joining the points $5i - 2j + 2k$ and $3i + j - 4k$ .	10 Marks	L3	C01

OR

12.	a.	Apply Gauss Elimination method to solve the system of equations $x - 2y + 3z = 2, 3x - y + 4z = 4, 2x + y - 2z = 5.$	10 Marks	L3	C04
	b.	Determine the inverse of $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ .	10 Marks	L3	C04

13.	a.	Apply the Rolle's theorem to verify the function $f(x) = x^2 - 6x + 5$ in $(0, 6)$ .	10 Marks	L3	C02
	B	Evaluate $\lim_{x \rightarrow 0} (\cot x)^{\frac{1}{\log x}}$ .	10 Marks	L3	C02

Or

14.	a.	Apply the Cauchy's mean value theorem to verify the functions $f(x) = x^2 + 3$ & $g(x) = x^3 + 1$ in $(1, 3)$ .	8 Marks	L3	C02
	b.	Evaluate $\lim_{x \rightarrow \frac{\pi}{2}} (1 - \sin x) \tan x$ .	6 Marks	L3	C02
	c.	Examine the derivative of $f(x) = \frac{\log(\sin x)}{\cot x}$ .	6 Marks	L3	C02

15.	a.	Solve $\int x^2 \sin^2 x dx$ .	8 Marks	L3	C03
	b.	Apply appropriate method to solve $\int \frac{3x-2}{(x-1)(x+2)(x-3)} dx$ .	8 Marks	L3	C03
	c.	Evaluate $\int \log(1 + x^2) dx$ .	4 Marks	L2	C03

Or

16.	a.	Apply suitable method to evaluate $\int \frac{7x-4}{(x-1)^2(x+2)} dx$ .	10 Marks	L3	C03
	b.	Apply integration by parts rule to solve $\int x^n \log x dx$ and using the obtained result evaluate $\int x^2 \log x dx$ .	10 Marks	L3	C03

17.	a.	Apply Gauss Jordan method to solve $2x + 3y - z = 5$ , $4x + 4y - 3z = 3, 2x - 3y + 2z = 2$ .	10Mark s	L3	C04
	b.	If $(i + 6j - 7k) \times (i + \lambda j - \mu k) = 0$ , then find $\lambda$ and $\mu$ ?	5 Marks	L2	C01
	c.	Determine the direction cosines of the vector $V = -5i + j - k$ .	5 Marks	L2	C01

Or

18.	a.	Apply the Lagrange's mean value theorem to verify the function $f(x) = x(x - 1)$ in $(1,2)$ .	10 Marks	L3	C02
	b.	Solve $\int \frac{1}{(x-1)(x^2+1)} dx$ .	10 Marks	L3	C03

\*\*\*\*\* BEST WISHES \*\*\*\*\*