

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch - STATISTICS

MATHEMATICS –II FOR STATISTICS

Maximum: 75 Marks

Time: Three Hours

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Pick out the correct answer for the following: $\sin x + \cos x$ is _____ function. (a) an odd (b) an even (c) neither an odd nor an even (d) both (a) and (b)	K1	CO1
	2	Choose the correct answer: The Fourier coefficient a_0 for $f(x) = x \sin x$ in $(-\pi, \pi)$ is ____ (a) 0 (b) 1 (c) 2 (d) -2	K2	CO1
2	3	The auxiliary equation of $Pp + Qq = R$ is _____ (a) $\frac{dx}{p} = \frac{dy}{q}$ (b) $\frac{dx}{p} = \frac{dz}{R}$ (c) $\frac{dx}{p} = \frac{dy}{q} = \frac{dz}{R}$ (d) $\frac{dx}{p} = \frac{dy}{q} = \frac{dz}{R}$	K1	CO2
	4	The partial differential equation by eliminating the arbitrary constants a and b from $z = (x + a)(y + b)$ is _____ (a) $z = p + q$ (b) $z = p - q$ (c) $z = \frac{p}{q}$ (d) $z = pq$	K2	CO2
3	5	Find the value of $L(\cosh 3t) =$ ____ (a) $\frac{s}{s^2+3}$ (b) $\frac{3}{s^2+3}$ (c) $\frac{s}{s^2-9}$ (d) $\frac{3}{s^2-9}$	K1	CO3
	6	Find the value of $L(2) =$ ____ (a) $\frac{1}{s}$ (b) $\frac{2}{s}$ (c) s (d) $2s$	K2	CO3
4	7	The value of $L^{-1}(F(s+a)) =$ ____ (a) $e^{ax}L^{-1}(f(s))$ (b) $e^{-ax}L^{-1}(f(s))$ (c) $af(\frac{s}{a})$ (d) $\frac{1}{a}f(\frac{s}{a})$	K1	CO4
	8	Find the value of $L^{-1}(\frac{5}{s}) =$ ____ (a) 0 (b) 1 (c) 5 (d) $-2t$	K2	CO4
5	9	Specify the correct statement for: The diagonally dominant matrix from the following matrices _____. (a) $\begin{bmatrix} 2 & 1 \\ 4 & -3 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 1 \\ 1 & -3 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix}$ (d) $\begin{bmatrix} 5 & -3 \\ 1 & 2 \end{bmatrix}$	K1	CO5
	10	Convert the augmented matrix for the system of the equation $2x + 3y = -5; 3x - 2y = -2$. (a) $\left(\begin{array}{cc c} 2 & 3 & -5 \\ 3 & -2 & -2 \end{array} \right)$ (b) $\left(\begin{array}{cc c} 2 & 3 & -5 \\ 3 & -2 & -2 \end{array} \right)$ (c) $\left(\begin{array}{cc c} 2 & 3 & -5 \\ 3 & -1 & 2 \end{array} \right)$ (d) $\left(\begin{array}{cc c} 2 & 3 & -5 \\ 3 & -1 & -2 \end{array} \right)$	K2	CO5

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SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Find the half range sine series of $f(x) = x \cos x$ in $(0, \pi)$.	K2	CO1
	(OR)			
	11.b.	Expand $f(x) = \cos x, 0 < x < \pi$ in a Fourier sine series.		
2	12.a.	Form the partial differential equation by eliminating the arbitrary functions f and g from $z = f(2x + y) + g(3x - y)$.	K2	CO2
	(OR)			
	12.b.	Solve $px + qy = x$.		
3	13.a.	Find $L(\sin^3 2t)$.	K2	CO3
	(OR)			
	13.b.	Find $L(5e^{8t} + \cosh 3t + \sin 5t)$.		
4	14.a.	Evaluate $L^{-1}\left(\frac{s}{s^2+49} + \frac{1}{s+\sqrt{7}}\right)$.	K3	CO4
	(OR)			
	14.b.	Evaluate $L^{-1}\left(\frac{s+6}{(s+6)^2+9}\right)$.		
5	15.a.	Solve by Gauss-Jordan method for the following equations: $2x + y + 4z = 12, 8x - 3y + 2z = 20, 4x + y - z = 33$.	K4	CO5
	(OR)			
	15.b.	Solve by Gauss-elimination method for the following: $3.15x - 1.96y + 3.85z = 12.95, 2.13x + 5.12y - 2.89z = -8.61,$ $5.92x + 3.05y + 2.15z = 6.88$.		

SECTION - C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Express $f(x) = x \sin x$ as a Fourier series in $0 \leq x \leq 2\pi$.	K2	CO1
2	17	Solve $x(y^2 + z)p - y(x^2 + z)q = z(x^2 - y^2)$.	K2	CO2
3	18	Find $L(\sin^2 t \cos^3 t)$.	K2	CO3
4	19	Evaluate $L^{-1}\left(\frac{s+3}{(s^2+6s+13)^2}\right)$.	K3	CO4
5	20	Solve, by Gauss-Seidel method of iteration the equations: $27x + 6y - z = 85, 6x + 15y + 2z = 72, x + y + 54z = 110$.	K4	CO5

Z-Z-Z

END