22STU206

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2023
(Second Semester)

Branch – **STATISTICS**

MATHEMATICS - II

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 $f(x)$ is odd then
(i) $\int_{-a}^{a} f(x)dx = 0$ (ii) $\int_{-a}^{a} f(x)dx = 1$
(iii) $\int_{0}^{a} f(x)dx = 0$ (iv) $\int_{0}^{a} f(x)dx = 1$

2 Lagrange's linear equation known as
(i) $ax + by = 1$ (ii) $Pp + Qp = R$
(iii) $x^2 + y^2 = 1$ (iv) $apq + bpq = 0$

3 $L[f(t) + g(t)] =$
(i) $f(t)$ (ii) $g(t)$ (iii) $f(t) + g(t)$ (iv) $L[f(t)] + L[g(t)]$

4 $L^{-1}\left[\frac{1}{s-a}\right] =$
(i) e^{at} (ii) te^{at} (iii) t^2at (iv) $t^n e^{at}$

5 Gauss-Seidal method is only a refinement of _____ method
(i) Gauss Jacobi (ii) Eulers
(iii) Runge Kutta (iv) Eulers modified

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a Express $f(x) = x\ (-\pi < x < \pi)$ as a Fourier series with period 2π

OR

b Find a sine series for $f(x) = c$ in the range 0 to π

7 a Solve $\frac{\partial^2 z}{\partial x \partial y} = 0$

OR

b Solve $p^2 + q^2 = npq$

8 a Find $L(t^2 + 2t + 3)$

OR

b Find $L(\cos at)$

9 a Find $L^{-1}\left(\frac{s}{s^2+b^2}\right)$

OR

b Find $L^{-1}\left(\frac{s-3}{s^2+4s+13}\right)$

Cont...

10 a Solve the system of equations by Gauss elimination method
$x + 2y + z = 3, 2x + 3y + 3z = 10, 3x - y + 2z = 13$

OR

b Solve the system of equations by Gauss Jordan method
$x + 2y + z = 3, 2x + 3y + 3z = 10, 3x - y + 2z = 13$

SECTION -C (30 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Express $f(x) = \frac{1}{2}(\pi - x)$ as a Fourier Series with period 2π to be valid in the interval 0 to 2π

OR

b Find in the range $-\pi$ to π, a Fourier series for $y = \begin{cases} 1+x & 0 < x < \pi \\ -1+x & -\pi < x < 0 \end{cases}$

12 a Solve $z = px + qy + \sqrt{1 + p^2 + q^2}$

OR

b Find the general solution of $(y + z)p + (z + x)q = x + y$

13 a Find $L(e^{-at} \sin bt)$

OR

b Find $L(\sin^3 2t)$

14 a Find $L^{-1}\left[\frac{1}{s(s+1)(s+2)}\right]$

OR

b Find $L^{-1}\left[\frac{1+2s}{(s+2)^2(s-1)^2}\right]$

15 a Solve the following system by Gauss-Jacobi method
$10x - 5y - 2z = 3, 4x - 10y + 3z = -3, x + 6y + 10z = -3$

OR

b Solve the following system by Gauss Seidal method
$10x - 5y - 2z = 3, 4x - 10y + 3z = -3, x + 6y + 10z = -3$

Z-Z-Z END