

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2026
(Second Semester)
Branch -**ELECTRONICS**
MATHEMATICS-II FOR ELECTRONICS

Time: Three Hours

Maximum: 75 Marks

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	A Fourier series consists of: _____ (i) Only sine terms (ii) Only cosine terms (iii) Sine and cosine terms (iv) Logarithmic terms	K1	CO1
	2	Fourier series converges if function satisfies: _____ (i) Dirichlet conditions (ii) Newton's laws (iii) Lagrange conditions (iv) Euler condition	K2	CO1
	3	A partial differential equation is formed by eliminating _____ (i) Variables (ii) Constants and functions (iii) Functions only (iv) Coefficients	K1	CO2
	4	The singular solution of Clairaut's equation is obtained by _____ (i) Differentiation w.r.t variables (ii) Eliminating parameters (iii) Integration (iv) Substitution	K2	CO2
3	5	$L^{-1}\left\{\frac{1}{s-3}\right\} = \underline{\hspace{2cm}}$ (i) e^{3t} (ii) e^{-3t} (iii) $3e^{3t}$ (iv) $3e^{-3t}$	K1	CO3
	6	The Laplace transform of a periodic function depends on: (i) Only T (ii) Only $f(t)$ (iii) Both T and $f(t)$ over one period (iv) None	K2	CO3
4	7	Fourier Transform of even function is _____ (i) Odd (ii) Even and real (iii) Complex (iv) Zero	K1	CO4
	8	If $f * g$ is convolution, then _____ (i) $F + G$ (ii) FG (iii) F / G (iv) None	K2	CO4
5	9	Gauss-Jordan method reduces matrix to _____ (i) Upper triangular form (ii) Lower triangular form (iii) Diagonal (identity) form (iv) Symmetric form	K1	CO5
	10	In Gauss Elimination, the system is solved using _____ (i) Differentiation (ii) Back substitution (iii) Iteration (iv) Forward substitution	K2	CO5

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(5 × 7 = 35)

ALL questions carry EQUAL Marks (3 × 7 = 21)				
Module No.	Question No.	Question	K Level	CO
1	11.a.	Develop $f(x) = \frac{\pi-x}{2}$ as a fourier series, in the interval $0 \leq x \leq 2\pi$.	K3	CO1
	OR			
	11.b.	If $f(x) = \begin{cases} -x & -\pi < x < 0 \\ x & 0 < x < \pi \end{cases}$, Develop Fourier series also deduce that $\frac{\pi^2}{8} = 1 + \frac{1}{3^2} + \frac{1}{5^2} + \dots$		

Cont...

2	12.a.	Examine and eliminate the function and form P.D.E from $f(x^2 + y^2 + z^2, z^2 - 2xy) = 0$	K3	CO2
	OR			
	12.b.	Solve $(2y - z) dx + 2(x - z) dy - (x + y) dz = 0$.		
	13.a.	Find the Laplace transforms of $f(t) = \begin{cases} e^t & 0 \leq t \leq 1 \\ 0 & 1 < t < \infty \end{cases}$	K4	CO3
	OR			
	13.b.	Construct the Laplace inverse of $(\frac{1}{s(s+1)(s+2)})$		
4	14.a.	Examine $F_c\{e^{-ax}\}$ and $F_s\{e^{-ax}\}$.	K3	CO4
	OR			
	14.b.	Examine the fourier cosine transform for F(x) if $f(x) = \begin{cases} 1 & \text{when } x < 1 \\ 0 & \text{when } x > 1 \end{cases}$ Deduce that $\int_0^\infty \frac{\sin s}{s} ds = \frac{\pi}{2}$.		
5	15.a.	Solve the matrix by Gauss – Jordan Method $2x + y + 4z = 12, 8x - 3y + 2z = 20, 4x + 11y - z = 33$.	K4	CO5
	OR			
	15.b.	Solve the equation by Gauss Jacobi method of iteration $27x + 6y - z = 85, 6x + 15y + 2z = 72, x + y + 54z = 110$.		

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	Construct the fourier series for the function $x^2 = \frac{\pi^2}{3} + 4 \sum_{n=1}^{\infty} (-1)^n \frac{\cos nx}{n^2}$ in the interval $(-\pi \leq x \leq \pi)$	K3	CO1
2	17	Solve $(y^2 + yz)dx + (xz + z^2)dy + (y^2 - xy)dz = 0$.	K4	CO2
3	18	Construct and solve the differential equations $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} - 3y = e^{3t}$. With the condition $y(0) = 0, y'(0) = 0$.	K4	CO3
4	19	Simplify and obtain the fourier transform for the $F_c\left\{\frac{1}{\sqrt{x}}\right\} = F_c\left\{\frac{1}{\sqrt{x}}\right\} = \left\{\frac{1}{\sqrt{s}}\right\}$	K3	CO4
5	20	Determine and solve by Gaussian elimination procedure, the equations $3.15x - 1.96y + 3.85z = 12.95,$ $2.13x + 5.12y - 2.89z = -8.61$ $5.92x + 3.05y + 2.15z = 6.88$	K5	CO5

Z-Z-Z

END