22ELU206N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(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 function f(x) is periodic with period ____ a) 2π b) 3π c) 4π d) 5π	K1	CO1
	2	The exponential form of Fourier series involves terms of the type ____ a) e^{inx} b) e^{nx} c) sinnx d) cosnx	K2	CO1
2	3	A partial differential equation is formed by ____ a) Differentiating an equation containing arbitrary constants b) Differentiating an equation containing arbitrary functions c) Eliminating arbitrary constants (or) arbitrary functions d) Integrating an ordinary differential equation	K1	CO2
	4	The general solution of the partial differential equation $\frac{\partial z}{\partial x} = 0$ is ____ a) z = f(x) b) z = f(y) c) z = c d) z = x+y	K2	CO2
3	5	Which of the following is a sufficient condition for the existence of Laplace transform of f(t)? a) f(t) is piecewise continuous on every finite interval and of exponential order b) f(t) is periodic with any period c) f(t) is continuous everywhere d) f(t) is bounded everywhere	K1	CO3
	6	If L{f(t)} = F(s), then L{ e^{5t}f(t)} is ____ a) F(s+5) b) F(s-5) c) e^5F(s) d) e^5 F(s+5)	K2	CO3
4	7	If f and g are any two scalar point functions, then ∇(f +g) = ____ a) ∇f +∇g b) ∇f - ∇g c) ∇f .∇g d) ∇f /∇g	K1	CO4
	8	If Curl $\vec{F}$ =0, then $\vec{F}$ is said to be ____ a) Rotational b) Irrotational c) Solenoidal d) Harmonic	K2	CO4
5	9	The line integral of a conservative vector field along a closed path is ____ a) Maximum b) Minimum c) Zero d) Infinite	K1	CO5
	10	The divergence theorem relates ____ a) Line integral and Surface integral b) Surface integral and Volume integral c) Two line integrals d) Double integral	K2	CO5

Cont...

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.	Expand $f(x) = (\pi - x)^2$ in $(-\pi, \pi)$ as a Fourier series.	K3	CO1
		(OR)		
	11.b.	Determine the half range sine series of $f(x) = x^2$ in $(0, \pi)$		
2	12.a.	Establish the partial differential equation of all planes having equal intercepts on the x and y axis.	K4	CO2
		(OR)		
	12.b.	Eliminate φ_1 and φ_2 from $z = \varphi_1(x).\ \varphi_1(y)$.		
3	13.a.	Classify $L(e^{2t} + 3e^{-5t})$.	K2	CO3
		(OR)		
	13.b.	Identify $L^{-1}\left[\frac{1}{(s+1)^2+1}\right]$.		
4	14.a.	If $\varphi = x^2 + y - z - 1$, evaluate grad φ at (1,0,0).	K3	CO4
		(OR)		
	14.b.	Prove that curl(grad φ) = 0.		
5	15.a.	Analyze $\iint_S curl\,\vec{F}\,\hat{n}\,ds = 0$, where S is any closed surface by using Gauss's divergence theorem.	K4	CO5
		(OR)		
	15.b.	Show that $\vec{F} = x^2\vec{i} + y^2\vec{j} + z^2\vec{k}$ is a conservative vector field.		

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	Appraise the Fourier series of $f(x) = e^{ax}$ in $(0,2\pi)$	K5	CO1
2	17	Examine the PDE $z = p^2 + q^2$	K4	CO2
3	18	Analyze $L^{-1}\left[\frac{(s)^2}{(s-1)^4}\right]$	K4	CO3
4	19	Show that $\vec{F} = yz\,\vec{i} + zx\,\vec{j} + xy\vec{k}$ is irrotational	K4	CO4
5	20	Verify Green's theorem in a plane for the integral $\int_c \{(x-2y)dx + xdy\}$, taken around the circle $x^2+y^2=1$	K5	CO5

Z-Z-Z END