22ELU206N/ 22ELU206

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 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	F(x) is the periodic with period_____ a) π b) 2π c) $-\pi$ d) $(\pi,-\pi)$	K1	CO1
	2	A functionf(x)is said to be even if____ a) F(-x)=f(x) b) F(x)=-f(x) c) F(-x)=-f(x) d) none	K2	CO2
2	3	Solve: $\frac{\partial z}{\partial x}=\cos x$ $a) z=\cos x+f(y)$ $b) z=\sin x+f(y)$ $c) z=-\cos x+f(y)$ $d) z=-\sin x+f(y)$	K1	CO1
	4	Let f(x,y,z,p,q)=0 be a pde whose complete integral is _____ $a)\phi(x,y,z)=0$ $b)\phi(x,y,z,a)=0$ $c)\phi(x,y,z,a,b)=0$ $d)\phi(x,y)=0$	K1	CO2
3	5	Solve : $L[\sin 7t]$= _____ $a)\frac{7}{s+49}$ $b)\frac{7}{s^2+49}$ $c)\frac{7}{s+9}$ $d)\frac{7}{s^2+9}$	K1	CO1
	6	Find $L(e^{2t}+3e^{-5t})$____ $a)\frac{1}{s-2}+3.\frac{1}{s+5}$ $b)\frac{1}{s-2}-3.\frac{1}{s+5}$ $c)\frac{1}{s+2}+3.\frac{1}{s+5}$ $d)\frac{1}{s-2}+3.\frac{1}{s-5}$	K2	CO2
4	7	If $\phi=x^2+y-z-1$, find $grad\phi$ at (1,0,0) is____ $a)2\vec{i}+\vec{j}+\vec{k}$ $b)2\vec{i}+\vec{j}-\vec{k}$ $c)2\vec{i}-\vec{j}+\vec{k}$ $d)2\vec{i}-\vec{j}-\vec{k}$	K1	CO2
	8	If $\vec{F}$ is irrotational then____ $a)\nabla\times\vec{F}=1$ $b)\nabla\times\vec{F}=0$ $c)\nabla\times\vec{F}=-1$ $d)\vec{F}=0$	K2	CO2
5	9	If $\int_C \vec{F}.d\vec{r}$ is independent of the path then curl $\vec{F}$ is _____ a) 0 b) 1 c) 0 & 1 d) none	K1	CO1
	10	$\vec{F}=x^2\vec{i}+y^2\vec{j}+z^2\vec{k}$ is _____ $a)\nabla\times\vec{F}=1$ $b)\nabla\times\vec{F}=0$ $c)\nabla\times\vec{F}=2$ $d)\nabla\times\vec{F}=3$	K2	CO2

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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.	Show that the Fourier series for f(x)=x, $-\pi \prec x \prec \pi$ is given by f(x)=2 $\sum_{n=1}^{\infty}(-1)^{n+1}\frac{\sin nx}{n}$	K2	CO1
		(OR)		
	11.b.	Determine the Fourier series expansion of $f(x)=\pi^2-x^2$ in $(-\pi,\pi)$.	K3	
2	12.a.	Solve : $z = px + qy + \frac{p}{q} - p$	K2	CO2
		(OR)		
	12.b.	Solve: $p(1+q^2)=q(z-a)$		
3	13.a.	Find $L^{-1}\left[\frac{1}{s(s+2)^3}\right]$	K4	CO3
		(OR)		
	13.b.	Find L $L^{-1}\left[\cos^{-1}(s+1)\right]$		
4	14.a.	If $\vec{F}=(x+y+1)\vec{i}+\vec{j}-(x+y)\vec{k}$, prove that $\vec{F}.curl\vec{F}=0$.	K3	CO4
		(OR)		
	14.b.	Find the value of 'a' so that the vector $\vec{F}=(x+3y)\vec{i}+(y-2z)\vec{j}+(x+az)\vec{k}$ is solenoidal.		
5	15.a.	If $\vec{F}=x^2\vec{i}+y^2\vec{j}$ evaluate $\int \vec{F}d\vec{r}$ along the line y=x from (0,0) to (1,1).	K5	CO4
		(OR)		
	15.b.	Using divergence theorem,evaluate $\iint_S \vec{r}.\hat{n}ds$ where S is the surface of the sphere $x^2+y^2+z^2=9$.		

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	Find the Fourier series for f(x)= e^{ax} in a Fourier series in $(0,2\pi)$.	K3	CO1
2	17	Solve : p tan x + q tan y = tan z.	K5	CO2
3	18	Find $L^{-1}\left[\frac{1}{s^2(s^2+81)}\right]$	K3	CO3
4	19	Evaluate $\int_{C_1}\vec{F}.d\vec{r}$ where $\vec{F}=x^2\vec{i}+y^3\vec{j}$ and C_1 is a portion of the parabola $y=x^2$ in the XY plane from A(0,0) to B(1,1).	K3	CO4
5	20	Evaluate $\iint_S \vec{F}.\hat{n}ds$ where $\vec{F}=z\vec{i}+x\vec{j}-y^2z\vec{k}$ and S is the surface of the cylinder $x^2+y^2=1$ included in the first octant between the planes z=0 and z=2.	K5	CO4

Z-Z-Z END