22MAU204N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch - **MATHEMATICS**

CALCULUS - II

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	$\lim_{n\to\infty}\left(\frac{n}{n+1}\right)$=----- a) 1 b)0 c) ½ d)∞	K1	CO1
	2	Every bounded, monotonic sequence is ----------- a)Completeness b)convergent. c)divergent d)Oscillating	K2	CO1
2	3	A series$\sum a_n$ is called -----------if the series of absolute values $\sum\|a_n\|$is convergent. a) absolutely convergent b) conditionally convergent. c)divergent d)oscillating	K1	CO2
	4	If a series$\sum a_n$ is absolutely convergent, then it is ------- a) convergent b) conditionally convergent. c)divergent d)oscillating	K2	CO2
3	5	$\lim_{n\to\infty}\frac{x^n}{n!}$=----- a) 1 b)0 c) ½ d)∞	K1	CO3
	6	Radius of convergence of $Cosx$ = a) 1 b)0 c) ½ d)∞	K2	CO3
4	7	If F is conservative, then $curlF =$ -------- a) 1 b)0 c) ½ d)∞	K1	CO4
	8	$\int_a^b F'(x)dx = F(b) - F(a)$ is known as a) Fundamental Theorem b) conservative vector c) independent of path d)oscillating	K2	CO4
5	9	$\iint_S F'ds = \iiint_V divFdv$ is known as a) Fundamental Theorem b) Divergence Theorem c) Green's Theorem d) Stokes Theorem	K1	CO5
	10	$\oint_c (L\,dx + M\,dy) = \iint_D \left(\frac{\partial M}{\partial x} - \frac{\partial n}{\partial y}\right) dx\,dy$ *is known as* a) Green's theorem b) Stoke's theorem c) divergence theorem d) Fundamental theorem	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.	If $\sum a_n$ and $\sum b_n$ are convergent series, then so are the series $\sum(a_n + b_n)$ then prove that $\sum_{n=1}^{\infty}(a_n + b_n) = \sum_{n=1}^{\infty} a_n + \sum_{n=1}^{\infty} b_n$	K5	CO1
		(OR)		
	11.b.	Determine whether the series $\sum_{n=1}^{\infty} \frac{ln\, n}{n}$ converges or diverges.		
2	12.a.	State and prove root test.	K6	CO2
		(OR)		
	12.b.	Test the series $\sum_{n=1}^{\infty}(-1)^n \frac{n^3}{3^n}$ absolutely convergent.		
3	13.a.	Find the Maclaurin series for $sinx$ and prove that it represents $sinx$ for all x.	K2	CO3
		(OR)		
	13.b.	Find the approximate the function $f(x) = \sqrt[3]{x}$ by a Taylor polynomial of degree 2 at x =8.		
4	14.a.	Find the work done by the force field $F(x.y) = x^3 i - xyk$ in moving a particle along the quarter-circle $r(t) = costi + sintj, 0 \leq t \leq \frac{\pi}{2}$	K3	CO4
		(OR)		
	14.b.	Show that the vector field , $F = xz\bar{i} + xyz\bar{j} - y^2\bar{k}$ is not conservative.		
5	15.a.	Find the surface area of a sphere of radius.	K1	CO5
		(OR)		
	15.b.	Find the flux of the vector field $F(x,y,z) = z\,\bar{i} + y\,\bar{j} + x\bar{k}$ across the unit circle sphere $x^2 + y^2 + z^2 = 1$.		

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	State and prove Comparison test.	K2	CO1
2	17	State and prove ratio test.	K2	CO2
3	18	Derive Taylors series.	K4	CO3
4	19	Evaluate $\int_C x^4 dx + xydy$ is the triangular curve consisting of the line segments from (0,0) to (1,0) from (1,0) to (0,1) and from (0,1) to (0,0)	K5	CO4
5	20	Evaluate $\int_C F.dr$ where $F(x,y,z) = -y^2 i + xj + z^2 k$ and is the curve of intersection of the plane $y + z = 2$ and the cylinder $x^2 + z^2 = 1$	K5	CO5

Z-Z-Z END