

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2026
(Second Semester)
Branch – **STATISTICS**
NUMERICAL METHODS

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	Newton-Raphson method is used to: a) Solve differential equations b) Find roots of algebraic equations c) Perform interpolation d) Numerical integration	K1	CO1
	2	State the other name of Regula-Falsi method a) Secant method b) False position method c) Bisection method d) Newton method	K2	CO1
2	3	The forward difference operator (Δ) is defined as: a) $\Delta y = y(x-h) - y(x)$ b) $\Delta y = y(x) + y(x+h)$ c) $\Delta y = y(x+h) - y(x)$ d) $\Delta y = y(x) - y(x+h)$	K1	CO2
	4	The fundamental theorem of finite differences states that: a) $\Delta x^n = n x^{n-1}$ b) Δx^n is a polynomial of degree n-1 c) $\Delta x^n = 0$ d) $\Delta x^n = 1$	K2	CO2
3	5	When Central difference interpolation is used ? a) Data is at the beginning b) Data is at the end c) Data is near the center d) Data is unequal	K1	CO3
	6	Inverse interpolation is used to: a) Find x for given y b) Find y for given x c) Find derivative d) Find integral	K2	CO3
4	7	Recall the use of the Trapezoidal rule. a) Differentiation b) Root finding c) Numerical integration d) Interpolation	K1	CO4
	8	Simpson's 1/3 rule is applicable when the number of intervals is: a) Odd b) Even c) Prime d) Zero	K2	CO4
5	9	Euler's method is used to solve: a) Algebraic equations b) Partial differential equations c) Ordinary differential equations d) Integral equations	K1	CO5
	10	Milne's method is a: a) Single step method b) Predictor-Corrector method c) Root finding method d) Integration method	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.	Find root of $x^2 - x - 1 = 0$ using Newton-Raphson method (2 iterations)	K3	CO1
		(OR)		
	11.b.	Explain Iteration method with example.	K3	
2	12.a.	Describe Newton's forward interpolation formula.	K3	CO2
		(OR)		
	12.b.	Describe Lagrange's interpolation formula.	K3	
3	13.a.	Explain Gauss central difference formula.	K3	CO3
		(OR)		
	13.b.	Derive Sterling's formula.		
4	14.a.	Evaluate integral of x^2 from 0 to 2 using Trapezoidal rule (h=1).	K4	CO4
		(OR)		
	14.b.	Derive Simpson's 1/3 rule.		
5	15.a.	Solve $dy/dx = x+y$, $y(0)=1$ using Euler's method (h=0.1, one step).	K4	CO5
		(OR)		
	15.b.	Explain Runge-Kutta second order method.		

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	Solve $x^3 - 2x - 5 = 0$ using Iteration method.	K4	CO1
2	17	Using Lagrange's interpolation, find $f(2)$ for data: (1,1), (2,4), (3,9).	K4	CO2
3	18	Describe inverse interpolation with example.	K3	CO3
4	19	Evaluate $\int_6^1 e^x dx$ using Simpson's 1/3 rule with n =6 intervals.	K4	CO4
5	20	Using Taylor method compute $Y(0,2)$. Give that $dy/dx=1-2xy$ and $Y(0)=0$.	K4	CO5

Z-Z-Z

END