PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Third Semester)

Branch – **NUTRITION, FOOD SERVICE MANAGEMENT & DIETETICS**

MATHEMATICS

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	Every ------- matrix satisfies its own characteristic equation a) Symmetric b) identity c) diagonal d) square	K1	CO1
	2	$\|A\| = 0$ then matrix called as a) Symmetric b) identity c) diagonal d) singular	K2	CO1
2	3	$1+\sqrt{3}$ is one of the rational root then another one is a) $1-\sqrt{3}$ b) 1 c) $\sqrt{3}$ d) $\pm\sqrt{3}$	K1	CO2
	4	If α,β,γ are roots of $x^3+px^2+qx+r=0$, then $\alpha+\beta+\gamma=$ a) -p b) q c)p d)-r	K2	CO2
3	5	Which method is said to be iterative method a) Gauss Elimination method b) Gauss Jordon method c) Gauss Seidal method d falsi method	K1	CO3
	6	Gauss Seidal method iteration convergence only if the coefficient of the matrix is a) Lower triangular matrix b) Upper triangular matrix c) Diagonally dominant d) Transposed Matrix	K2	CO3
4	7	Which of the following symbol is called Newton Back ward operator? a)Δ b)∇ c)E d)δ	K1	CO4
	8	In the Newton forward difference formula u = ? a)$u=\frac{x-x_n}{h}$ b) $u = x - x_n$ c) $u=\frac{x-x_0}{h}$ d)$u = x - x_0$	K2	CO4
5	9	While applying Simson's 3/8 rule the interval should be? a) Ordinates is even b) n is multiple of 3 c) n is odd d) n is even	K1	CO5
	10	For Newton-cote's formula the space should be a) Equi distant b) n is multiple of 3 c) n is odd d) n is even	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 the eigen values of $A = \begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$	K1	CO1
		(OR)		
	11.b.	Using Cayley Hamiltonian theorem find the inverse of the matrix $\begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$	K4	CO1
2	12.a.	Solve the equation $x^4 - 5x^3 + 4x^2 + 8x - 8 = 0$ given the one of the root is $1 - \sqrt{5}$	K1	CO2
		(OR)		
	12.b.	If α,β,γ are roots of $x^3 + px^2 + qx + r = 0$, find the value of $(i) \sum \alpha^2 \quad (ii) \sum \alpha^2 \beta \gamma$	K6	CO2
3	13.a.	Solve by Gauss -Elimination method 3x +4y + 5z =18, 2x - y + 8z =13, 5x -2y + 7z =20	K1	CO3
		(OR)		
	13.b.	Using the Gauss-Jacobi method solve up to four iteration the following equations 8x -3y +2 z =20, 4x +11y - z =33, 6x + 3y + 12z =35	K5	CO3
4	14.a.	From the Following data, Find θ at x = 83 x: 40, 50, 60, 70, 80, 90 θ: 184, 204, 226, 250, 276, 304	K3	CO4
		(OR)		
	14.b.	Using Lagrange's interpolation formula find the value f(10) for the data X: 5, 6, 9, 11 Y: 12, 13, 14, 16	K2	CO4
5	15.a.	Find the first and second derivatives of the of the function tabulated below at the point x=1.5 X: 1.5, 2.0, 2.5, 3.0, 3.5, 4.0 f(x): 3.375, 7.0, 13.625, 24.0, 38.875, 59.0	K1	CO5
		(OR)		
	15.b.	Using trapezoidal rule, evaluate $\int_0^1 \frac{dx}{1+x^2}$ taking h=0.2	K4	CO5

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 eigen value and eigen vectors of the matrix $A = \begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$	K2	CO1
2	17	Solve the equation $x^3 - 6x^2 + 13x - 10 = 0$ whose roots are in Arithmetical progression	K1	CO2
3	18	Using the Gauss-Seidal method solve the following equatio 28x + 4y - z = 32, x +3y + 10z = 24, 2x +17y + 4z = 35	K4	CO3
4	19	Using Lagrange's interpolation formula find the value f (3) for the data X: 0, 1, 2, 4, 5, 6 Y: 1, 14, 15, 5, 6, 19	K3	CO4
5	20	Evaluate $\int_0^{\frac{\pi}{2}} \sin x dx$, Using Simson's rule and trapezoidal rule.	K5	CO5

Z-Z-Z END