

**PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)**

**BA DEGREE EXAMINATION MAY 2026
(Second Semester)**

Branch – **ECONOMICS**

MATHEMATICAL METHODS - 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	Define the derivative of a constant i) 1 ii) 0 iii) x iv) ∞	K1	CO1
	2	Interpret the meaning of elasticity > 1 i) Inelastic demand ii) Unitary elasticity iii) Elastic demand iv) Zero demand	K2	CO1
2	3	Find $\partial(xy)/\partial y$ i) x ii) y iii) xy iv) 1	K1	CO2
	4	Interpret the odd one out i) $U = x^2 + 10y$ ii) $U = 6x^3 + 4x^2y$ iii) $U = x^3 + 5x^2$ iv) $U = x^2 + xy$	K2	CO2
3	5	Recall the total differential of $Z = x + y$ i) $dx + dy$ ii) $x + y$ iii) 1 iv) 0	K1	CO3
	6	Explain Euler's theorem i) Applies to linear functions ii) Applies to homogeneous functions iii) Applies to constants iv) Applies to equations	K2	CO3
4	7	Find the value of the integral e^x i) x^e ii) e^x iii) $e^x/x+1$ iv) e	K1	CO4
	8	Infer the marginal cost function is $MC = 2Q + 5$, and fixed costs are 100, what is the total cost function? i) $TC = Q^2 + 5Q + 100$ ii) $TC = 2Q + 105$ iii) $TC = Q^2 + 5Q$ iv) $TC = 2 + 100Q$	K2	CO4
5	9	Define Linear Programming i) Non-linear optimization ii) Optimization of linear objective function iii) Integration method iv) Algebraic equation	K1	CO5
	10	Infer the use of game theory in economics i) Accounting ii) Strategic decision making iii) Data entry iv) Simple calculation	K2	CO5

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.	Illustrate the relationship between average cost and marginal cost curves using differentiation concepts.	K3	CO1
		(OR)		
	11.b.	Solve $\frac{dy}{dx}$ of the following $y = (x+2)^2$.		

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Cont...

2	12.a.	Construct the partial derivatives of 1. $z = 16x^2 + 4xy + y^2$ 2. $z = 4x^2 + 5y + 6$	K3	CO2
	(OR)			
	12.b.	Solve the cross partial derivatives of $f(x) = x^2 + y^3 - xy$		
3	13.a.	Contrast the total differential of the sum of terms $z = (x^2 + y)(2x - y^2)$	K4	CO3
	(OR)			
	13.b.	Classify the degree of homogeneity of the following functions: $Z = f(X_1, X_2) = X_1^3 + 4X_1^2X_2 + X_2^3$		
4	14.a.	Analyse the integration of the function: $\int (e^x + x^{-2} + 1)dx$	K4	CO4
	(OR)			
	14.b.	Simplify the following Functions : $\int (2x + 3)^3 dx$		
5	15.a.	A firm produces two products A and B. Profit per unit of A is ₹5 and B is ₹8. Each unit of A requires 2 hours of labour and B requires 3 hours. Total labour available is 60 hours. Evaluate and Formulate the LPP	K5	CO5
	(OR)			
	15.b.	Assess and solve the following game $\begin{bmatrix} 2 & 4 \\ 3 & 1 \end{bmatrix}$		

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	Analyse the Maximum and Minimum values of the following function $Y = 2x^4 - 8x^3 + 6x^2 + 4$	K4	CO1
2	17	Examine the demand functions for two commodities x_1 and x_2 $x_1 = p_1^{-1.7} p_2^{0.8}$ and $x_2 = p_1^{0.5} p_2^{-0.2}$ Determine whether the commodities are complementary or competitive and also find four partial elasticities of demand	K4	CO2
3	18	Examine the $\frac{dy}{dx}$ of the implicit function: $x^2 - xy - 3x + 7 = 0$	K4	CO3
4	19	Evaluate $I = \int x^2 \log x \cdot dx$	K5	CO4
5	20	Evaluate and interpret the solution for the following LPP by graphical method, Maximize $Z = 3x + 7y$ Subject to, $x + 4y \leq 20$ $2x + y \leq 30$ $x + y \leq 8$ $x, y \geq 0$.	K5	CO5