PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BA DEGREE EXAMINATION MAY 2024
(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	Find the derivative of the following function: $f(x) = 1963$ a) $+\infty$ b) 1963 c) $-\infty$ d) 0	K1	CO1
	2	The marginal revenue and marginal cost functions of a company are MR = 30 – 6x and MC = -24 + 3x where x is the product, then the profit function is_____. a) $9x^2 + 54x$ b) $9x^2 - 54x$ c) $54x – 9x^2/2$ d) $54x – 9x^2/2 + k$	K2	CO1
2	3	What does the derivative represent in calculus? a) Slope of the tangent line b) Area under the curve c) Accumulated sum d) Average value	K1	CO2
	4	The technique for selecting a new point depends upon _____. a) Scope of the problem b) Nature of the problem c) Range of the problem d) Analysis of the problem	K2	CO2
3	5	Find the differentiation of $x^4 + y^4 = 0$. a) $-x^3/y^4$ b) $-x^4/y^3$ c) $-x^3/y^3$ d) x^3/y^3	K1	CO3
	6	The structural optimization problem is generally expressed as _____. a) Maximize Z = F(x) b) Minimize Z = F(x) c) Z = F(x) d) Z = F(t)	K2	CO3
4	7	Integrate $\int_0^2 (x^2+x+1)\, dx$. a) 15/2 b) 20/5 c) 20/3 d) 3/20	K1	CO4
	8	The producer's surplus when the supply function for a commodity is P = 3 + x and x0 = 3 is _____. a) 5/2 b) 9/2 c) 3/2 d) 7/2	K2	CO4
5	9	Which of the following is a type of Linear programming problem? a) Manufacturing problem b) Diet problem c) Transportation problems d) All the above	K1	CO5
	10	When Minimax and Maximin criteria match, then a) A fair game exists b) Unfair game exists c) Mixed strategy exists d) Saddle point exists	K2	CO5

SECTION - B (35 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks $(5 \times 7 = 35)$

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the application of differential calculus in economics.	K2	CO1
		(OR)		
	11.b.	Form the differential equation representing the family of curves $y = a \sin(x + b)$, where a, b are arbitrary constants.		
2	12.a.	Find the partial derivative of $f(x,y) = x^2y + \sin x + \cos y$.	K3	CO2
		(OR)		
	12.b.	Find the first and second partial derivatives of $z = x^3 + y^3 - 3axy$.		
3	13.a.	Calculate the total differential of the function $z=3x^3+3yx^2+xy^2$.	K4	CO3
		(OR)		
	13.b.	Explain the major properties of the Cobb-Douglas production function.		
4	14.a.	Integrate the function $f(x)=2x \sin(x^2+1)$ with respect to x.	K5	CO4
		(OR)		
	14.b.	Evaluate the given indefinite integral problem: $\int 6x^5 - 18x^2 + 7\, dx$		
5	15.a.	Explain the characteristics of linear programming.	K6	CO5
		(OR)		
	15.b.	Illustrate the classification and description of game theory.		

SECTION -C (30 Marks)
Answer ANY THREE questions
ALL questions carry EQUAL Marks $(3 \times 10 = 30)$

Module No.	Question No.	Question	K Level	CO
1	16	Find the maxima and minima for $f(x) = 2x^3-21x^2+36x-15$.	K4	CO1
2	17	Elucidate the different partial derivatives rules.	K4	CO2
3	18	Solve the Linear Differential Equation = $dy/dx = [1/(1+x^3)] - [3x^2/(1 + x^2)]y$.	K5	CO3
4	19	The demand function of a commodity is $y = 36 - x^2$. Find the consumer's surplus for $y_0 = 11$.	K6	CO4
5	20	Calculate the maximal and minimal value of $z = 5x + 3y$ for the following constraints. $x + 2y \le 14$ $3x - y \ge 0$ $x - y \le 2$.	K6	CO5

Z-Z-Z   END