22ECU205N/22ECU205/N19ECU05

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BA DEGREE EXAMINATION MAY 2025
(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	If $y = 5x$, then $\frac{dy}{dx}$ a) 3 b) 4 c) 5 d) 6	K1	CO1
	2	The first order condition for y to be either maximum or minimum is a) $\frac{dy}{dx} > 0$ b) $\frac{dy}{dx} < 0$ c) $\frac{dy}{dx} > 1$ d) $\frac{dy}{dx} = 0$	K1	CO1
2	3	If $u = x^2 + y^2$, then $\frac{\partial u}{\partial z} =$ ____ a) 0 b) $2x$ c) $2y$ d) $2z$	K1	CO2
	4	If $f(x,y) = 2x^3 + y^2$ then $\frac{\partial f}{\partial y}$ at $x = 0$ a) $2y$ b) $\frac{1}{2x^3}$ c) 0 d) $\frac{2}{y}$	K1	CO2
3	5	Who has been credited to devise the Cobb-Douglas Production Function? a) Cobb and Douglas b) Cobb and Marshal c) Douglas and Arastu d) Above all	K1	CO3
	6	Marginal production of CES is always a) negative b) cubic c) positive d) None of them	K1	CO3
4	7	Evaluate $\int dx$ a) $\frac{x}{2} + c$ b) x^2 c) $\frac{x^2}{2} + c$ d) $x + c$	K1	CO4
	8	Find the value of the integral $\int_{-1}^{1} x^3\, dx$ a) -1 b) 0 c) 1 d) 2	K1	CO4
5	9	Which of the following is a method for solving LPP? a) Newton's method b) Simplex method c) Binary search d) Gaussian elimination	K1	CO5
	10	In game theory, a player is a) The person who designs the game b) A referee of the game c) A participant in the game d) A neutral observer	K1	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 derivative of the function $f(x) = x^3 \log x$	K4	CO1
		(OR)		
	11.b.	Find the second derivative of $y = x^3 + 4x^2 - 6x$		
2	12.a.	If $f(x,y) = x^3 + y^3 - 3xy$ find $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2}$	K3	CO2
		(OR)		
	12.b.	If $f(x,y) = \log\left(\frac{1}{x^2+y^2}\right)$, then find $\frac{\partial f}{\partial x} + \frac{\partial f}{\partial y}$	K4	
3	13.a.	Verify the Euler's theorem for $u = 3x + 2y - 4z$	K4	CO3
		(OR)		
	13.b.	Write the characteristics of the Cobb Douglas production function	K2	
4	14.a.	Evaluate $\int (x^3 + 4x^2 - 5x - 6)\, dx$	K3	CO4
		(OR)		
	14.b.	Evaluate $\int_{-2}^{2} (x^2 + 2x + 8)\, dx$		
5	15.a.	Solve the LPP by graphical method Maximize $Z = 7x + 5y$ Subject to $x + 2y \leq 6$ $4x + 3y \leq 12$ $x, y \geq 0$	K5	CO5
		(OR)		
	15.b.	Find the optimum plan for both players	K4	

		Player B			
Player A	-2	0	0	5
	4	2	1	3
	-4	-3	0	-2
	5	3	-4	2

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 maximum and minimum value of the cost function* $C = 5 + 2x^2 - x^3$	K4	CO1
2	17	*If* $u = x^3 + y^3 + z^3 + 3xyz$, *show that* $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial z}{\partial z} = 3u$	K3	CO2
3	18	*Find the total derivative* $\frac{dz}{dy}$ *of* $z = 5x + xy + y^2$, *where* $x = 3y^2$	K4	CO3
4	19	Evaluate the integral $\int x^2 e^{2x}\, dx$ by integration by parts.	K4	CO4
5	20	Use simplex Method to solve Max. $Z = x_1 + x_2 + 3x_3$ Subject to the constraints $3x_1 + 2x_2 + x_3 \leq 3$ $2x_1 + x_2 + 2x_3 \leq 2$ $x_1, x_2, x_3 \geq 0$	K5	CO5

Z-Z-Z END