19ECU05

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BA DEGREE EXAMINATION MAY 2022
(Second Semester)

Branch – **ECONOMICS**

MATHEMATICAL METHODS - II

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 Choose the correct one related to the functional relationship between x and y
(i) Algebra (ii) Integration calculus
(iii) Matrix analysis (iv) Differential calculus

2 If $z=3xy+4x^2$, what is the value of $\partial z \partial x$?
(i) 3y+8x (ii) $3x+4x^2$
(iii) 3xy+8x (iv) 3y+3x+8x

3 Find out the total derivative if f(x, y) = xy
(i) ydx + xdy (ii) xdx +ydy
(iii) dx + dy (iv) dx - dy

4 $\int 1.dx = ?$
(i) x+c (ii) 0
(iii) dx (iv) ∞

5 A two-person zero-sum game means that the
(i) the sum of losses to one player is equal to the sum of gains to other
(ii) the sum of losses to one player is not equal to the sum of gains to other
(iii) no any player gains or losses
(iv) number of players

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a Analyse the differential calculus its relation to marginal analysis.
OR
b Find $\frac{dy}{dx}$ of the following y = (x + 2) (3x + 2).

7 a Find the partial derivatives of z = (x + 4) (2x + 5y).
OR
b Find first and second order partial derivatives of $z = x^3 e^{2y}$

8 a Find total differential of the sum of terms $z = 3x^2 + xy - 2y^3$.
OR
b Optimize the profit function $\pi(Q) = 1/3Q^3 - 2Q^2 + 480Q - 150$.

9 a Integrate: Sin(ax + b).
OR
b Evaluate: $\int \frac{x.dx}{2x^2+3}$.

10 a Apply the concepts, classification and description of Game Theory.
OR
b Analyse the value of game.

$$\begin{bmatrix} 2 & 5 \\ 7 & 4 \end{bmatrix}.$$

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Analyse Maximum and Minimum values of the function $Y= 3x^4 - 10x^3 + 6x^2 + 5$.

OR

b Apply the following TC and TR functions to find the profit maximising level of output also find profit at this level.
$TC = 1/3Q^3 - 7Q^2 + 111Q + 50$
$TR = 100Q - Q^2$

12 a Following are the demand functions for two commodities x_1 and x_2

$$x_1 = p1^{-1.7}\ p2^{0.8} \text{ and}$$
$$x_2 = p1^{0.5}\ p2^{-0.2}$$

Determine whether the commodities are complementary or competitive and also find four partial elasticities of demand.

OR

b Find first and second order partial derivatives of $Z = \frac{x+4}{2x+5y}$.

13 a Find the total differential of $Z = \sqrt{3x^2 + y^2}$.

OR

b Find $\frac{dy}{dx}$ of the implicit function: $x^2 - xy - 2x + 3 = 0$.

14 a Apply the integral of $\int (\sin^3 x + \cos^3 x / \sin^2 x.\cos^2 x)dx$ and (II) $\int 1/x.dx$.

OR

b Analyse $I = : \int x^2 \log x.dx$.

15 a Apply the dual of the given primal

$$\text{Max } Z = 6x_1 + 4x_2 + 7x_3 + 5x_4$$
$$\text{Subject to } x_1 + 2x_2 + 3x_3 + 2x_4 \leq 20$$
$$6x_1 + 5x_2 + 3x_3 + 2x_4 \leq 100$$
$$3x_1 + 5x_2 + 4x_3 + 21x_4 \leq 75$$
$$\text{And } x_j \geq 0 \ (j = 1 \text{ to } 4)$$

OR

b Apply graphical method for the following LPP to find solution.

$$\text{Max } Z = 4x + 7y$$
$$\text{Subject to } x \leq 40$$
$$y \leq 30$$
$$x + y \leq 60$$
$$\text{and } x, y \geq 0$$

Z-Z-Z END