STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 86
(For Candidates admitted during the academic year 2019 – 2020 & thereafter)

SUBJECT CODE: 19EC/PE/ME15

M.A. DEGREE EXAMINATION NOVEMBER 2022
BRANCH III – ECONOMICS
FIRST SEMESTER

COURSE : ELECTIVE
PAPER : MATHEMATICS FOR ECONOMICS
TIME : 3 HOURS **MAX. MARKS: 100**

SECTION – A

ANSWER ANY FIVE QUESTIONS IN 300 WORDS: **(5 x 8 = 40)**

1.a) If A= $\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}$ and AB= $\begin{pmatrix} 7 & 3 \\ 15 & 5 \end{pmatrix}$ Find B?

b) State the Limitations of Input-Output analysis.

2. The total cost C is given by $C= 0.015x^3-0.03x^2+20x+2000$ Find
   i) Total cost when output=5
   ii) AC when output x=8
   iii) MC when output x=4.

3. Optimize function $z= 4x^2+3xy+6y^2$ subject to the constraint $x + y =56$.

4. Explain the Formulation of the Dual Programme.

5. Integrate $2x+5/ (x^2+4x+5)$

6. Determine the rank matrix

$$A= \begin{pmatrix} -3 & 6 & 2 \\ 1 & 5 & 4 \\ 4 & -8 & 2 \end{pmatrix}$$

7. Solve the following differential equations
   a) $d^2y/dx^2-6dy/dx+8y=e^{2x}$ b) $d^2x/dt^2-4dx/dt+3x=0$

SECTION – B

ANSWER ANY THREE QUESTIONS IN 1200 WORDS: **(3 x 20=60)**

8.a) Find the Inverse of $\begin{pmatrix} 2 & 3 & 4 \\ 3 & 2 & 1 \\ 1 & 1 & -2 \end{pmatrix}$

b) Solve by matrix method
   2x+4y+z=5, x+y+z= 6 , 2x+3y+z=6

9. a) If the demand law is $p= (4-5x)^2$, in what value of x, the elasticity of demand is unity.
   b) Find all the first and second order partial derivatives with respect to x and y of the function $u= x^3+ y^3 - 3xy$.

……2

10. a) Given the utility function $U=10x+20y-x^2-y^2+2xy$ where x and y are the commodities consumed. Find out the total differential dU.

    b) A monopolistic firm has the following demand function for each of ithe products x and y. $x=72-0.5P_x$ and $y=120-P_y$. The combined cost function is $C= x^2+xy+y^2+35$ and maximum joint production is 40. Thus $x+y=40$. Find the profit maximizing level of a) Output b) price and c) profit.

11. Solve the L.P.P
    Maximise $Z= 2x_1+3x_2$
    S.To $x_{1+}x_2 \leq 30$
    $x_2 \ _z \geq 3$,
    $0 \leq x_2 \leq 12$,
    $x_1 - x_2 \geq 0$,
    $0 \leq x_1 \leq 20$.

12. The demand and supply laws are $P_d= (6-x)^2$ and $P_s =14+x$ respectively. Find the consumer's surplus, if
    i) the demand and price are determined under pure competition and
    ii) the demand and price are determined under monopoly and supply function is identified with the marginal cost function.

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