SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.A. END SEMESTER EXAMINATIONS NOVEMBER-2022
SEMESTER - V
20UECET5ME1 - Mathematics for Economists

Total Duration : 2 Hrs 30 Mins. **Total Marks : 60**

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. If A = $\begin{pmatrix} 1 & 2 & -3 \\ 4 & 5 & 6 \\ 7 & 8 & -9 \end{pmatrix}$ B = $\begin{pmatrix} 4 & -3 & 2 \\ 1 & 6 & -4 \\ 7 & 1 & 3 \end{pmatrix}$ and C = $\begin{pmatrix} 6 & 2 & 1 \\ 4 & 0 & 7 \\ 2 & 1 & 6 \end{pmatrix}$
   Show that i) A + (B+C) = (A+B) +C ii) A+B = B+A
2. Solve the following equations by using Cramer's rule 3x + 2y- z - 4 = 0, -x + y + 3z - 6 = 0, 5x + 3y + z - 2 = 0
3. Discuss the types of Input-Output models.
4. Find the total differential of z = x^2 - y^2 / ($x^2 + y^2$)
5. Determine the extreme values of the function u = $x^3 + y^3$ - $3x - 27y$ + 24.
6. Examine the relationship between the average and marginal costs with suitable diagram and also provide mathematical proof.
7. Solve the function for maxima or minima points z = x^3 + $3x^2$- y^2 + 4.
8. Examine the importance of Input - Output analysis.

Section B

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Describe any three properties of determinants with your own set of examples.
10. Three sector economy has following input – output coefficient matrix and final demand A = $\begin{pmatrix} 0 & 0.5 & 0 \\ 0.2 & 0 & 0.5 \\ 0.4 & 0 & 0 \end{pmatrix}$ D = $\begin{pmatrix} 1000 \\ 5000 \\ 4000 \end{pmatrix}$
    Compute the gross output of each sector.
11. Discuss the sum, product and quotient rules of differentiation with your own set of examples.

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12. Determine the maximum and minimum value of the function
    y = $2x^3$ - $3x^2$ - $36x + 10$
13. A firm sells two products A & B. Their joint demand functions are
    $X_1 = 175 - 4P_1 - P_2$, $X_2 = 90 - 2P_1 - 3P_2$ where X_1 and X_2 are the units demanded of two products when their market prices are Rs. P_1 and Rs. P_2 per unit respectively. Evaluate the prices which should be charged to maximise total revenue of the two products and also find the maximum revenue.

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