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. (Eco) END SEMESTER EXAMINATIONS NOVEMBER - 2023
SEMESTER - V
**20UECET5ME1 - Mathematics for Economists**

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

## Section B

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

1. What are the different types of matrices? Give explain.
2. Explain the properties of Determinants Overview.
3. Complete the following Input-Output tables using proper function

**A**

| Input | Output |
|---|---|
| 1 | 5 |
| 2 | 10 |
| 3 | 15 |
| 4 | 20 |

**B**

| Input | Output |
|---|---|
| 6 | 36 |
| 7 | 49 |
| 8 | 64 |
| 9 | 81 |

4. A farmer sells potatoes and tomatoes in a market. During the day, he gets 3 customers. The first customer demands 2 kg of potatoes and 1 kg of tomatoes. The second customer demands 1 kg of potatoes and 2 kg of tomatoes. The third customer demands 5 kg of potatoes and 2 kg of tomatoes. The price of potatoes per kg is 30 and the price of tomatoes per kg is 20.

   a) Draw the input-output table for the given situation and find the revenue earned by the farmer from each customer and the total revenue.

   b) Formulate a mathematical expression to show the relationship between the price of potatoes and tomatoes, the quantities sold and the revenue.

   c) If a fourth customer visits his shop and demands 3 kg of potatoes and 2 kg of tomatoes, calculate the total revenue earned by the farmer using the mathematical equation formulated in question b.
5. Find the derivative of the function f(x) = $6x^2 - 4x$
6. Differentiate f(x) =$(x+2)^3/\sqrt{x}$
7. Solved Examples on Maxima and Minima Find the turning points of the function y = $4x^3 + 12x^2 + 12x + 10$.
8. What is meant by partial derivatives? Give definition, formula and example.

**Contd...**

## Section C

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

9. Solve the following system of equations using Cramer's rule:
   $x + y + z = 6$
   $y + 3z = 11$
   $x + z = 2y$ or $x - 2y + z = 0$.
10. Suppose an economy consists of two industries-steel and automobiles. In order to produce automobiles, the economy requires steel and automobiles. Similarly, in order to produce steel, the economy requires automobiles and steel. To produce one-rupee worth of steel, the steel industry requires 0.2 paisa worth of steel and 0.7 paisa worth of automobiles. To produce one-rupee worth of automobile, the automobile industry requires 0.5 paisa worth of steel and 0.1 paisa worth of automobiles. Also suppose that the economy has to export 15000 worth of steel and 5000 worth of automobiles.
    a) Express the above problem as an input-output model.
    b) How much of worth of steel and automobiles should be produced to meet the total demand?
11. Explain the differential Calculus Basics.
12. Find the maxima and minima for $f(x) = 2x^3-21x^2+36x-15$.
13. What is Properties of maxima and minima? Explain the first-order derivative and second-order derivative tests are used.

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