No. of Printed Pages : **2**

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M.A. II Semester Degree Examination, September/October - 2022

ECONOMICS

21ECO2C8L : Mathematics for Economics

Time : 3 Hours Maximum Marks : 70

Note : *Answer* ***any five*** *of the following with question number* ***1*** *is* ***compulsory****. Each question carries* ***equal*** *marks.*

1. (a) What is a Relation ? Explain different types of Relations. **5**

(b) Find the Domain and Range of the following Relations : **4**

$R_1=\left\{(1, 1), \left(2, \frac{1}{2}\right), \left(3, \frac{1}{3}\right), \left(4, \frac{1}{4}\right)\right\}$

$R_2=\{(1, 1), (4, 2), (9, 3), (16, 4)\}$

(c) Let $A=\{1, 2, 3, 4\}$ $B=\{2, 4, 6, 8\}$, $C=\{3, 4, 5, 6\}$ Show that $A\cup(B\cap C)=(A\cup B)\cap(A\cup C)$ **5**

2. Given $A=\begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix}$ $B=\begin{bmatrix} 1 & 2 & -3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix}$ $C=\begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & 4 & 3 \end{bmatrix}$ show that **14**

$A(B+C)=AB+AC.$

3. Solve the following equations by Cramer's Rule (or) by matrix inverse method. **14**

$2x_1+4x_2-x_3=15$

$x_1-3x_2+2x_3=-5$

$6x_1+5x_2+x_3=28$

4. (a) List out rules of differentiation with suitable examples. **7**

(b) Find the extreme values of the function : **7**

$y=15x^3-9x^2-8x$

5. If the demand function is $P=25-3x-3x^2$ and the demand x_0 is 2, what is consumer surplus ? **14**

P.T.O.

6. (a) Let $K = \begin{bmatrix} 3 & 7 \\ 4 & 8 \\ 2 & 1 \end{bmatrix}$ $L = \begin{bmatrix} 2 & 5 \\ 6 & -3 \\ 4 & 11 \end{bmatrix}$, find $K - L$ and $L - K$. **7**

(b) Let $M = \begin{bmatrix} 4 & 6 & 2 \\ 1 & 7 & 4 \\ 3 & 9 & 2 \end{bmatrix}$ and $N = \begin{bmatrix} 8 \\ 7 \\ 1 \end{bmatrix}$, find MN and NM. **7**

7. Describe the steps involved in constrained optimisation of a function. **14**

8. (a) Given total cost $C = Q^3 - 12Q^2 + 60Q + 120$, find marginal cost. **5**

(b) Find $\frac{dy}{dx}$ when $y = (8x^3 - 5)^9$. **5**

(c) Find $\int x^3 dx$. **4**

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