

# CSSR & SRRM DEGREE & PG COLLEGE

(AUTONOMOUS)

UG (CBCS) REGULAR EXAMINATIONS, APRIL/MAY-2025

BA Honours, SEMESTER-II

## Mathematical Methods for Economics

(w.e.f. 2024-25 Admitted Batch)

Time: 3 hrs.

(No additional sheet will be supplied)

Max. Marks: 70

### SECTION-A

I. Answer any FIVE questions

5 x 4 = 20 M

- Define Finite set and Infinite set with examples.
- If  $A = \{1,2,3\}$  and  $B = \{x,y\}$  then find  $A \times B$  and  $B \times A$ .
- Define continuity of a function and the Derivative of a function.
- If  $f(x) = \log(\sec x + \tan x)$  then find  $f'(x)$ .
- Explain the concept of optimization.
- Write the difference between constrained and unconstrained optimization.
- Define integration and write some rules.
- Define feasible solution and optimal solution.
- If  $A = \begin{bmatrix} 2 & 3 & -1 \\ 7 & 8 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 0 & 1 \\ 2 & -4 & -1 \end{bmatrix}$  then find  $A + B$  and  $B + A$ .
- If  $A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 3 & 4 \\ 5 & -6 & x \end{bmatrix}$  and  $\det A = 45$  then find 'x'.

### SECTION-B

II. Answer ALL questions

5 x 10 = 50 M

- Explain the Role of Mathematical methods in Economics.  
or
- If  $A = \{1,3,5,7\}$ ,  $B = \{5,7,11,13\}$  and  $C = \{11,13,17\}$  then show that  
(i)  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$   
(ii)  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
- If  $f = \log(x^2 + y^2)$  then show that  $\frac{\partial^2 f}{\partial x \partial y} = \frac{\partial^2 f}{\partial y \partial x}$   
or
- Explain the Applications of derivatives in Economics
- Explain the optimization in Economics.  
or
- The profit function  $p(x)$  of a company selling 'x' items per day is given by  $p(x) = (150 - x)x - 1600$ . Find the number of items that the company should sell to get maximum profit. Also, find the maximum profit.
- Explain applications of Linear programming in Economics.  
or
- Mathematical formulation of the Linear programming problem.
- If  $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 0 \end{bmatrix}$  then examine whether A and B are commute with respect to matrix multiplication.  
or
- Solve the following simultaneous linear equations by using Cramer's Rule  
 $3x + 4y + 5z = 18$ ,  $2x - y + 8z = 13$  and  $5x - 2y + 7z = 20$