

Sessional Examination, 2023

B.A. 2<sup>nd</sup> Semester

Paper :- ECO-HC-2026

Mathematical Methods in Economics - II

Time - 1 hour

Marks - 20

1. Answer the following questions (Any Two)

1x2=2.

a) Define Equality of matrices

b) If the two rows (or columns) of a determinant were identical, the value of the determinant will be \_\_\_\_\_.

c) Is  $(AB)' = B'A'$  correct?

2. Answer the following questions (any one)

2x1=2.

a) Find AB and BA given -

$$A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 3 & 0 \\ 4 & 2 \end{bmatrix}$$

b) Given  $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 5 & 0 \\ 2 & 2 \end{bmatrix}$ , show that

i)  $(A+B)'$  and ii)  $(AB)' = B'A'$

3. Solve the following system of simultaneous equation by using Cramer's rule -

6x1=6.

$$4x_1 + 2x_2 - x_3 = 40$$

$$2x_1 + 3x_2 = 43$$

$$x_1 + 3x_3 = 38$$

4. Answer the following questions (any one)  $10 \times 1 = 10$

a) The average and total cost function of a discrimination firm are given by :-

$$AR_1 = 80 - 3Q_1$$

$$AR_2 = 104 - 4Q_2$$

$$TC = 50 - 10Q + 2Q^2$$

$$\text{Where } Q = Q_1 + Q_2$$

i) Find out equilibrium output and equilibrium price.

ii) Find out the maximum profit

iii) Find out  $MR_1$  and  $MR_2$  and iv) Find out elasticities of demand.

OR

b) A producer desires to minimize the cost  $C = 16K + 4L$  where  $K$  and  $L$  represent capital and labour respectively, subject to the given level of output  $Q_0 = 40 = 5K^{1/2} L^{1/2}$ . Find out least cost combinations of input.

OR

c) Solve the following equation system by matrix inversion -

$$2x_1 + x_2 + 3x_3 = 15$$

$$x_1 - 2x_2 + 5x_3 = 13$$

$$4x_1 + 3x_2 - x_3 = 11$$