

2014

ECONOMICS

(Major)

Paper : 3.1

(Elementary Mathematics for Economics)

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions : $1 \times 10 = 10$

(a) Write the subsets of the set $A = \{2, 3, 5\}$.

(b) Define a homogeneous function.

(c) When two sets are called disjoint sets?

(d) State when two matrices A and B are conformable for multiplication.

(e) State whether the following statement of equality is an equation or identity, and justify your answer :

$$(x+y)^2 = x^2 + 2xy + y^2$$

- (f) Define a diagonal matrix.
- (g) Find the limit of the function

$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$$

- (h) State the quotient rule of differentiation.

- (i) If

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

write the cofactor of the element a_{12} .

- (j) Find $\int \frac{1}{x^5} dx$.

2. Answer the following questions : $2 \times 5 = 10$

- (a) If

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

show that $(A')' = A$.

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- (b) State whether the equal or equivalent

$$A = \{1, 2, 3, 4\} \text{ and}$$

- (c) Can you add

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

Justify your answer.

- (d) Examine the continuity at the point $x = 1$

$$\begin{aligned} f(x) &= x^2 - 2x \\ &= 1 \\ &= 2x^2 - 3x \end{aligned}$$

- (e) Can you find a rectangular matrix answer.

3. Answer any four of the following

- (a) If

$$A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$$

show that $A^2 - 3I =$ identity matrix.

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(b) Find the inverse of

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$$

(c) If

$$y = \frac{x^4 + 1}{x^2 + 1}$$

find $\frac{dy}{dx}$.

(d) Given

$$y = \frac{(2x_1 - x_2^2)}{(x_1^2 + 3x_2)}$$

Find $\frac{\partial y}{\partial x_1}$ and $\frac{\partial y}{\partial x_2}$.

(e) Given

$$A = \begin{bmatrix} 2 & 3 & 0 \\ 5 & 1 & 2 \end{bmatrix} \text{ and } B = \begin{bmatrix} 4 & 1 \\ 2 & 3 \\ 1 & 5 \end{bmatrix}$$

Find AB .

(f) Evaluate

$$\int_1^2 (x^2 - 2x + 10) dx$$

4. Answer any four of the

(a) Solve the following matrix inversion

$$Q_d =$$

$$Q_s =$$

$$Q_d =$$

(b) Find $\frac{dy}{dx}$:

(i) $y = \log x(10 + x)$

(ii) $y = \frac{1 - vx}{1 + \sqrt{x}}$

(c) Find :

(i) $\int (4x - 5)^6 dx$

(ii) $\int \frac{1}{x \log x} dx$

(d) (i) Give the geometrical interpretation of

$$\int_a^b x^n dx$$

(ii) Given the marginal cost

$$MC = 3Q$$

where Q is output and TC is total cost (TC) function.

- (e) (i) Derive the total revenue function $R(Q)$, given the marginal revenue function as $R'(Q) = 100 - 0.5Q$. 4

(ii) If

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

find a matrix C of order 2×4 such that $A - C = 3B$. 6

- (f) In a three-sector economy, the input coefficient matrix and final demand vector are as given below :

$$A = \begin{bmatrix} 0.3 & 0.2 & 0.3 \\ 0.1 & 0.3 & 0.4 \\ 0.2 & 0.3 & 0 \end{bmatrix} \text{ and } F = \begin{bmatrix} 500 \\ 700 \\ 600 \end{bmatrix}$$

Find the sectoral output X_1 , X_2 and X_3 using Cramer's rule. 10

- (g) (i) If

$$A = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \\ 1 & 1 & 1 \end{bmatrix}$$

$$\text{and } C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \end{bmatrix}$$

prove that $(AB)C = A(BC)$. 8

- (ii) Prove that if a determinant has a zero row (or column) then its determinant is zero.

(h) Write short notes

- (i) Partial differentiation

- (ii) Assumptions model

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ECONOMICS

(Major)

Paper : 3.2

(**Monetary System**)

Full Marks : 80

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Answer the following : 1×10=10

- (a) What is the most distinguishing feature of money?
- (b) What is a standard money?
- (c) Why is net demand deposit is a component of money supply and not the gross demand deposit?
- (d) What is the most liquid asset of a commercial bank?
- (e) What distinguishes a commercial bank from other financial institutions?

- (f) Give two examples of 'near money'.
- (g) Who frames the monetary policy of India?
- (h) What distinguishes selective credit control from quantitative credit control?
- (i) What is a 'surplus unit' in an economy?
- (j) Which of the following is not a debt instrument?

Bond, Debentures, Equity, Treasury Bills

2. Answer the following questions : $2 \times 5 = 10$

- (a) State the components of 'narrow money'.
- (b) Name two assets and two liabilities of a commercial bank.
- (c) State two distinguishing features of a monetary policy.
- (d) What are the main components of a financial system?
- (e) Name two National Stock Exchanges of India.

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- 3. Answer any four of the following :
 - (a) State briefly the functions of a commercial bank.
 - (b) What is the concept of 'near money' and profitability of a commercial bank?
 - (c) What are the objectives of the creation of a commercial bank?
 - (d) Are the goals of a commercial bank output and price stability with each other?
 - (e) Distinguish between 'near money' and the capital market.
 - (f) What is a stock market and how is it calculated?

4. Answer any four of the following :

- (a) Discuss how money market affects the exchange rate.
- (b) Discuss different types of commercial banks.
- (c) Explain the procedure of opening a commercial bank.

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- (d) Comment on the role of commercial banks in the development of a region, including financial inclusion.
- (e) Critically discuss the quantitative credit control measures of a commercial bank.
- (f) Discuss the promotional role played by the RBI in the Indian economy.
- (g) Explain the role of a sound financial system in a modern economy.
- (h) Discuss how stock market contributes to the industrial development of a country.
