(h) Solve the input-output model $(I - A)X = F$ by using either matrix inversion or Cramer's rule, given

$$A = \begin{bmatrix} 0\cdot2 & 0\cdot2 & 0 \\ 0\cdot3 & 0\cdot2 & 0\cdot4 \\ 0\cdot2 & 0\cdot3 & 0\cdot1 \end{bmatrix}; \quad F = \begin{bmatrix} 100 \\ 220 \\ 150 \end{bmatrix}$$ 10

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2013

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 : 1×10=10

(a) If $U = \{5, 6, 7, 8, 9\}$ and $A = \{7, 8\}$, find the complement of A, i.e., $\tilde{A}$.

(b) The set of all real numbers is greater than 8 but less than 73. Write in set notation.

(c) Differentiate between 'domain' and 'range' of a function.

(d) Give an example of rectangular hyperbola.

(e) Find the limit of the function $\lim_{x \to 1} f(x) = \lim \frac{1 - x}{1 - x^2}$.

(f) Define 'dimension' or 'order' of a matrix.

(g) Find the transpose of A, given $A = \begin{bmatrix} 1 & 0 & 9 \\ 6 & 1 & 2 \end{bmatrix}$

(h) State the power rule of integration.

(i) Define rank of a matrix with example.

(j) Distinguish between a singular matrix and a nonsingular matrix.

2. Answer the following questions : 2×5=10

(a) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 \\ 2 & -1 \end{bmatrix}$, compute $2A - 3B$.

(b) State the conditions for equality of two matrices.

(c) If $C = 1000 + 6x + 0 \cdot 5x^2$, where C is total cost and x is output, find marginal cost (MC).

(d) Given $A = \begin{bmatrix} 2 & 0 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 0 \\ 5 & 1 \end{bmatrix}$, show that $(A + B)' = A' + B'$.

(e) Solve :

$$\int (2x^2 + x^2)\,dx$$

3. Answer briefly any *four* of the following : 5×4=20

(a) Prove that for any two scalars g and k—

(i) $k(A + B) = kA + kB$;

(ii) $(g + k)A = gA + kA$. 2½+2½=5

(b) State the power rule of differentiation. Given $y = \sqrt{x}$, find $\frac{dy}{dx}$. 2+3=5

(c) Find the derivative of the function

$$Y = f(x) = (10 + 5x^2)2x^3$$

using product rule.

(d) Find the cofactors of the matrix

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

(e) Given $y = f(x_1, x_2) = (x_1^2 + 5)(2x_1 - x_2^2)$, find $\frac{\delta y}{\delta x_1}$ and $\frac{\delta y}{\delta x_2}$.

(f) Find AB, given

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

4. Answer any *four* of the following : 10×4=40

(a) *(i)* A function is defined as follows :

$$f(x) = 1, \quad x > 1$$
$$= 0, \quad x = 0$$
$$= -1, \quad x < 0$$

Show that the function is discontinuous at $x = 0$. 5

(ii) State the conditions of continuity of a function. Differentiate between $f(a)$ and $\lim_{x \to a} f(x)$. 3+2=5

(b) Solve the following equation system by using Cramer's rule :

$$2x_1 + x_2 + 3x_3 = 15$$
$$x_1 - 2x_2 + 5x_3 = 13$$
$$4x_1 + 3x_2 - x_3 = 11$$

10

(c) State five properties of determinants. 2×5=10

(d) Solve the following market model using matrix inversion : 10

$$Q_d = 10 - 0 \cdot 4P$$
$$Q_s = -3 + 0 \cdot 6P$$
$$Q_d = Q_s$$

(e) *(i)* State and prove the quotient rule of differentiation. 5

(ii) If $y = \frac{2x-3}{x+1}$, find $\frac{dy}{dx}$ using quotient rule. 5

(f) *(i)* Find the definite integral :

$$\int_1^3 (4x - x^2 - 3)\, dx$$

5

(ii) Given the marginal revenue (MR) function, i.e., $R'(Q) = 50 - 4Q$, find the total revenue (TR) function, i.e., $R(Q)$. 5

(g) Discuss the structure of a static open input-output model. State its assumptions. 7+3=10

(e) "A well-organised Central Bank controls the internal price level, stabilises the exchange rate and prevents the occurrence of financial and industrial crisis." How does a Central Bank achieve these objectives? 10

(f) Discuss the promotional role of a Central Bank in a developing economy with special reference to RBI. 10

(g) Discuss the importance of the financial system in an economy. Distinguish between money market and capital market. 7+3=10

(h) Discuss the role of stock market in the economic development of a country. 10

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2013

ECONOMICS

(Major)

Paper : 3.2

(The Monetary System)

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions : 1×10=10

(a) What is meant by legal-tender money?

(b) Define token money.

(c) Mention one liability of commercial banks.

(d) What is meant by overdraft facility of a commercial bank?

(e) What is meant by 'letter of credit'?

(f) Mention one important method of qualitative or selective credit control.

(g) What is meant by cash reserve ratio?

(h) What is meant by bank rate?

(i) Mention one limitation of bank rate policy of the Central Bank.

(j) Define stock market.

2. Answer the following questions : 2×5=10

(a) Mention two functions of money.

(b) Mention two characteristics of a 'money market'.

(c) Define statutory liquidity ratio.

(d) Bring out the meaning of financial system.

(e) What is meant by stock market index?

3. Answer any *four* of the following questions in brief : 5×4=20

(a) Distinguish between money and near money. Give the significance of near money. 3+2=5

(b) What are the objectives of monetary policy? 5

(c) Explain the role of Central Bank as a custodian of foreign exchange reserves. 5

(d) Discuss in brief the significance of bank rate policy of the Central Bank. 5

(e) Explain briefly the features of a financial market. 5

(f) Write a note on the constituents of a financial system. 5

4. Answer any *four* of the following questions : 10×4=40

(a) Discuss the significance of money in a modern economy. 10

(b) Write a note on the functions of commercial banks. 10

(c) Discuss the various objectives of bank's portfolio management. How far can these objectives be achieved? 7+3=10

(d) Discuss briefly the principal methods adopted by a Central Bank to control credit. 10