

2 0 2 3

(CBCS)

(5th Semester)

ECONOMICS**SEVENTH PAPER****(Quantitative Techniques—I)***Full Marks : 75**Time : 3 hours**The figures in the margin indicate full marks for the questions**Simple calculator can be used in this paper***(SECTION : A—OBJECTIVE)**

(Marks : 10)

Tick (✓) the correct answer in the brackets provided :

1×10=10

1. The number of proper subset of the set {1, 2, 3, 4, 5} is

- (a) 25 ()
- (b) 28 ()
- (c) 31 ()
- (d) 34 ()

2. If $A = \{1, 2, 3, 4, 5, 6, 7\}$ and $B = \{2, 4, 6, 8\}$, then the cardinal number of $A - B$ is

- (a) 4 ()
- (b) 3 ()
- (c) 9 ()
- (d) 7 ()

3. The value for a function $y = f(x)$ is minimum, if
- (a) $f'(x) = 0$ and $f''(x) < 0$ ()
 - (b) $f'(x) = 0$ and $f''(x) > 0$ ()
 - (c) $f'(x) > 0$ and $f''(x) < 0$ ()
 - (d) $f'(x) < 0$ and $f''(x) < 0$ ()
4. The partial derivative of a function $z = 2x + 5y + 6xy$ with respect to x is
- (a) $5 + 6y$ ()
 - (b) $2 + 6y$ ()
 - (c) $5 + 6x$ ()
 - (d) $2 + 6x$ ()
5. The integral of a constant K is
- (a) K ()
 - (b) Kx ()
 - (c) $Kx + c$ ()
 - (d) 0 ()
6. If the marginal cost function of a firm is $MC = 3 + 8x + 15x^2$, where x is output, the total cost function will be
- (a) $x + 4x^2 + 5x^3 + C$ ()
 - (b) $x + 4x + 5x^3 + C$ ()
 - (c) $3x + 4x + 5x^3 + C$ ()
 - (d) $3x + 4x^2 + 5x^3 + C$ ()
7. If matrix A is of order 2×3 and matrix B is of order 3×2 , then what is the order of $A \times B$?
- (a) 2×3 ()
 - (b) 3×2 ()
 - (c) 2×2 ()
 - (d) 3×3 ()

8. The solutions of the equations by determinants method is called
- (a) inverse method ()
 - (b) rank method ()
 - (c) Cramer's rule ()
 - (d) None of the above ()
9. Linear programming deals with
- (a) constraints ()
 - (b) inequalities ()
 - (c) objective function ()
 - (d) All of the above ()
10. The value of objective function $Z = 2x + 3y$ at corner point (3, 2) is
- (a) 4 ()
 - (b) 8 ()
 - (c) 12 ()
 - (d) 16 ()

(SECTION : B—SHORT ANSWERS)

(Marks : 15)

Answer the following questions :

3×5=15

UNIT—I

1. Define linear function and quadratic function.

OR

2. Distinguish between endogenous and exogenous variables.

UNIT—II

3. Define price elasticity of demand and write down the price elasticity of demand function for the demand function $Q = 150 - 15P$.

OR

4. Write a short note on the concept of differentiability of a function.

UNIT—III

5. Differentiate between integrand and integral.

OR

6. Evaluate $\int \left(\frac{x^4 + 1}{x^2} \right) dx$.

UNIT—IV

7. Distinguish between singular matrix and non-singular matrix.

OR

8. Write any three properties of a determinant.

UNIT—V

9. Write any three assumptions of linear programming problem.

OR

10. Formulate dual of the given linear programming problem :

Maximize $Z = 40x_1 + 30x_2$
subject to

$$\begin{aligned} 4x_1 + x_2 &\leq 16 \\ 3x_1 + 2x_2 &\leq 8 \\ x_1 + 2x_2 &\leq 24 \\ x_1, x_2 &\geq 0 \end{aligned}$$

(SECTION : C—DESCRIPTIVE)

(Marks : 50)

Answer the following questions :

UNIT—I

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1. (a) Explain Cartesian products with examples. 3
(b) If $A = \{ 2, 4, 6 \}$, $B = \{ 6, 8 \}$ and $U = \{ 0, 2, 4, 6, 8, 10 \}$, then prove that
 $(A \cup B)' = A' \cap B'$. 3

- (c) The supply and demand functions for a commodity are given by $Q_s = 5p + 25$ and $Q_d = 10p - 5$. Find the equilibrium price and equilibrium quantity.

4

OR

2. (a) Distinguish between finite and infinite sets.

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- (b) Verify the associative law of union by using the following sets :

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$$A = \{3, 4, 5\}, B = \{3, 5, 7\} \text{ and } C = \{1, 2, 3\}$$

- (c) Out of 20 members in a family, 11 like to take tea and 14 like coffee. Assume that each one likes at least one of the two drinks. Find how many like both coffee and tea.

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UNIT—II

3. (a) Find the derivatives of the following :

2×2=4

(i) $y = 7x^4 + 2x^3 - 3x + 37$

(ii) $y = 10x + \log x + 2e^{5x}$

- (b) Given the demand function $P = 50 - 5Q^2$. Find the marginal revenue function.

2

- (c) Find the elasticity of supply for the given supply function $q = 25 - 4p + p^2$, when price is ₹ 5.

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OR

4. (a) The total cost function is represented by $TC = 2q^3 - 2q^2 + 4q + 80$, where q stands for output of the commodity. Find the AC and MC functions.

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- (b) The total cost and average revenue functions of a firm are given by $TC = \frac{1}{3}q^3 - 6q^2 + 2q + 40$ and $AR = 29 - 3q$ respectively. Find the equilibrium output and equilibrium price.

5+2=7

UNIT—III

5. (a) Evaluate the following :

(i) $\int x e^x dx$

(ii) $\int_2^4 (x^3 - 6x^2) dx$

- (b) Find the consumer's surplus when the inverse demand function is $p = 100 - 0.5q$ and the price is 20.

OR

6. (a) The marginal cost is given by $MC = 25 + 30Q - 9Q^2$ and the fixed cost is 55. Find the (i) total cost, (ii) average cost and (iii) variable cost functions.

2+2+2=

- (b) Find the producer's surplus at the equilibrium when the demand and supply functions are $P_d = 8 - 3x$ and $P_s = 4x - 6$ respectively.

UNIT—IV

7. (a) What is meant by identity matrix?

- (b) Given

$$A = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}, B = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \text{ and } C = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$$

What are the values of a , b , c and d if $A - B = C$?

- (c) Solve the following equations by using matrix inverse :

$$8x - 7y = -6$$

$$x + y = 3$$

OR

8. (a) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -1 \\ 6 & 7 \end{bmatrix}$, then prove that $(AB)' = B'A'$, where A' and B' are transposes of the matrices A and B respectively. 3
- (b) Solve the following equations by using Cramer's rule : 7

$$\begin{aligned} 7x - y - z &= 0 \\ 10x - 2y + z &= 8 \\ 6x + 3y - 2z &= 7 \end{aligned}$$

UNIT—V

9. What is linear programming? Explain the various procedures involved in the formulation of linear programming problem. 2+8=10

OR

10. Solve the following linear programming problem by graphical method and indicate the feasible region in the diagram : 8+2=10

Maximize $Z = 5x + 6y$
subject to

$$\begin{aligned} 2x + 3y &\leq 18 \\ 2x + y &\leq 12 \\ 3x + 3y &\leq 21 \\ x, y &\geq 0 \end{aligned}$$

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(CBCS)

(5th Semester)

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SEVENTH PAPER

(Quantitative Techniques—I)

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Time : 3 hours

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2 0 2 3

(CBCS)

(5th Semester)

ECONOMICS

EIGHTH (A) PAPER

(Agricultural Economics)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A—OBJECTIVE)

(Marks : 10)

Tick (✓) the correct answer in the brackets provided :

1×10=10

1. Non-farm sector includes

- (a) insurance, communication and manufacturing ()
- (b) livestock, fisheries and agricultural marketing ()
- (c) horticulture, communication and livestock ()
- (d) horticulture, fisheries and livestock ()

2. The percentage share of agriculture in GDP has been

- (a) rising ()
- (b) constant ()
- (c) declining ()
- (d) None of the above ()

3. Growing crops one after the other on the same field during different crop seasons is called
- (a) mixed farming ()
 - (b) multiple farming ()
 - (c) alternate farming ()
 - (d) intercropping ()
4. The land which is available for cultivation but not cultivated during the previous five or more years is termed as
- (a) wasteland ()
 - (b) cultivable wasteland ()
 - (c) fallow land ()
 - (d) grazing land ()
5. Land tenure system in which land revenue was collected by the village Headman was called
- (a) Zamindari ()
 - (b) Mahalwari ()
 - (c) Ryotwari ()
 - (d) All of the above ()
6. Which of the following is not a measure of land reforms?
- (a) Abolition of intermediaries ()
 - (b) Insecurity of tenures ()
 - (c) Ceiling on landholdings ()
 - (d) None of the above ()
7. The father of the Green Revolution is
- (a) Norman Borlaug ()
 - (b) Verghese Kurien ()
 - (c) M. S. Swaminathan ()
 - (d) None of them ()

8. Sustainable agriculture is a type of agriculture that focuses on producing long-term crops and livestock while having
- (a) minimal effects on environment ()
 - (b) maximum effects on environment ()
 - (c) minimal effects on production ()
 - (d) All of the above ()
9. If the marginal productivity of a labour is zero, then he is
- (a) unemployed ()
 - (b) employed ()
 - (c) disguised unemployed ()
 - (d) All of the above ()
10. During post-WTO period (1995-2003), the share of agro-good in India's global exports
- (a) has declined ()
 - (b) has increased ()
 - (c) remained stagnant ()
 - (d) None of the above ()

{ SECTION : B—SHORT ANSWERS }

(Marks : 15)

Write short notes on the following :

3×5=15

UNIT—I

1. Importance of forest resources in India

OR

2. Growth of dairy farming in India

UNIT—II

3. Distinction between Kharif and Rabi cropping seasons

OR

4. Factors responsible for low productivity of agricultural sector in India

UNIT—III

5. Objectives of land reforms in India

OR

6. Tenancy reforms

UNIT—IV

7. High-Yielding Variety (HYV) seeds

OR

8. Dryland farming

UNIT—V

9. Unemployment in rural India

OR

10. Globalization

(SECTION : C—DESCRIPTIVE)

(Marks : 50)

Answer the following :

10×5=50

UNIT—I

1. Discuss the composition and structure of rural economy. How is the rural economy important for the development of urban economy? 5+5=10

OR

2. What is meant by 'agro-based industries'? Give an assessment of the role played by agro-based industries in the development of Indian economy. 3+7=10

UNIT—II

3. Discuss the interdependence between agricultural sector and non-agricultural sector with special reference to Indian economy. Which, according to you, is more important for the development of the Indian economy? 8+2=10

OR

4. Discuss the importance of irrigation in the development of Indian agriculture. 10

UNIT—III

5. Discuss the three types of land tenure system that prevailed in India at the time of Independence. 10

OR

6. What do you mean by land reforms in India? What are the main components of land reforms in India? 2+8=10

UNIT—IV

7. What do you understand by 'sustainable agriculture'? Discuss the importance of sustainable agriculture in economic development. 3+7=10

OR

8. Discuss the importance of technological change in agricultural development. 10

UNIT—V

9. Give an overview of agricultural development in India since Independence. 10

OR

10. Discuss the impact of globalization on Indian agriculture. 10

2023

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