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(CBCS)

(5th Semester)

ECONOMICS

SEVENTH PAPER

(**Quantitative Techniques—I**)

Full Marks : 75

Time : 3 hours

Simple calculator can be used in this paper

(**PART : A—OBJECTIVE**)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 10)

Tick (✓) the correct answer in the brackets provided :   1×10=10

1. One variable expressed directly in terms of the other variables is a/an
   (a) explicit function   (   )
   (b) implicit function   (   )
   (c) rational function   (   )

2. If there is a one-to-one correspondence between the elements of the two sets, then the sets are said to be
   (a) equal sets   (   )
   (b) equivalent sets   (   )
   (c) disjoint sets   (   )

3. If $\dfrac{dy}{dx} > 0$, then

   (a) the curve rises from left to right   (   )

   (b) the curve remains stationary   (   )

   (c) the curve falls from left to right   (   )

4. Total revenue (TR) is maximum, when

   (a) MR > 0 (   )

   (b) MR < 0 (   )

   (c) MR $= 0$ (   )

5. If MC $= 4q^3 + 6q^2 - 4q$, then TC is

   (a) $q^4 + 3q^3 + 4$ (   )

   (b) $q^4 + 2q^3 - 2q^2$ (   )

   (c) $6q^2 + 12q - 4$ (   )

6. $\int dx =$

   (a) 1 (   )

   (b) x^2 (   )

   (c) $x + c$ (   )

7. If any two rows/columns of a determinant are interchanged, then

   (a) the value of the determinant remains unchanged   (   )

   (b) the value of the determinant is zero   (   )

   (c) the sign of the determinant changes   (   )

8. A special type of matrix in which there is only one row or one column is a/an

   (a) vector   (   )

   (b) indentity matrix   (   )

   (c) singular matrix   (   )

9. In a linear programming problem, if the given constraints fail to define a feasible region, then

   (a) multiple optimal solution will exist (   )

   (b) there will be no feasible solution (   )

   (c) None of the above (   )

10. The set of constraints in LP problem defines

   (a) a feasible region (   )

   (b) an optimal solution (   )

   (c) the objective function (   )

SECTION—B

(*Marks* : 15)

Answer the following questions :   3×5=15

1. (a) Distinguish between linear and quadratic equations.

   OR

   (b) Define cartesian product.

2. (a) If $y = x^3 - 5x^2$, find f'', when $x = 2$.

   OR

   (b) Mention the relationship between marginal cost and average cost.

3. (a) Define consumer's surplus.

   OR

   (b) If MR $= 50 - 7q$, then calculate the total revenue function.

4. (a) Define rank of a matrix.

   OR

   (b) Explain singular matrix.

5. *(a)* What is linear programming?

<div align="center">OR</div>

(b) Formulate the dual of the given linear programming problem :

Maximize $\quad Z = 2x_1 + 3x_2$

subject to

$$2x_1 + x_2 \leq 20$$
$$x_1 + 2x_2 \leq 20$$

and $\quad\quad x_1,\ x_2 \geq 0$

<div align="center">

(**PART : B—DESCRIPTIVE**)

(*Marks* : 50)

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The figures in the margin indicate full marks for the questions

1. *(a)* Define exogenous and endogenous variables.　　　　　　3

(b) Enumerate all the proper subsets of set $A = \{ a,\ b,\ c \}$.　　3

(c) State and verify associative laws of union and intersection by using the following sets :

$$A = \{1,\ 2,\ 4\},\quad B = \{4,\ 5,\ 6\} \text{ and } C = \{3,\ 4,\ 6,\ 7\}\qquad 4$$

<div align="center">OR</div>

2. *(a)* Distinguish between finite and infinite sets.　　　　3

(b) If $E = \{ a,\ b,\ c,\ d,\ e \}$ and $A = \{ b,\ c,\ e \}$, then find the complement of A.　　2

(c) In a survey of 100 students, it was found that 50 passed in Economics, 40 in Mizo, 55 in Geography, 15 in Economics and Mizo, 20 in Economics and Geography, 16 in Mizo and Geography and 3 in none of these subjects. How many students passed in all the three subjects?　　5

3. *(a)* State the condition for optimization of a function.　　2

(b) Find the point elasticity of demand for the demand function $q = 7 - 2p$, when $p = 2$.　　4

(c) Find the derivatives for the following functions (any *two*) : 2×2=4

  (i) $y = \dfrac{x-5}{x+3}$

  (ii) $y = 3x + e^{2x} + \log x$

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

OR

4. *(a)* Find the partial derivatives of $Z = (x+4)(2x+5y)$. 2

(b) The total revenue and total cost functions of a firm are given by $R = 30q - q^2$ and $C = 20 + 4q$ respectively. Find the profit maximizing output level. 3

(c) If $C = 2Q^3 - Q^2 + 4Q$, where Q is the output—

  (i) find MC;

  (ii) verify that at a minimum of average cost, AC = MC. 1+4=5

5. *(a)* Evaluate the following functions (any *two*) : 3×2=6

  (i) $\int (5x + 3)^3 \, dx$

  (ii) $\int xe^x dx$

  (iii) $\int_0^2 (3x^2 + 2x - 3) \, dx$

(b) If $MR = 16 - q^2$, then find the total and average revenue functions. 2+2=4

OR

5. *(a)* The demand and supply functions are given by $P_d = 3q^2 - 20q + 5$ and $P_s = 15 + 9q$ respectively, determine the producer's surplus under pure competition. 6

(b) The marginal cost function of a firm is given by $MC = 5 + 2x$, where x is the output. Find the total cost function, if the fixed cost is ₹ 200. 4

7. *(a)* Find the inverse of the matrix $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$. 4

(b) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 4 \\ 3 & 0 \end{bmatrix}$, verify whether $(AB)' = A'B'$, where A' and

B' are transposes of the matrices A and B respectively. 6

OR

8. *(a)* Given that

$$A = \begin{bmatrix} 7 & 1 \\ 0 & 4 \end{bmatrix} \quad B = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \quad \text{and} \quad C = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$$

Find the values of a, b, c and d, if $A + B = C$. 3

(b) Solve the following equations by Cramer's rule

$$x - 2y + 3z = 1$$
$$3x - y + 4z = 3$$
$$2x + y - 2z = -1$$

7

9. Discuss the various basic assumptions for the application of linear programming problems. 10

OR

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

Maximize $\quad Z = 3x_1 + 4x_2$

subject to

$$x_1 + x_2 \leq 6$$
$$2x_1 + 4x_2 \leq 21$$
$$x_1, \ x_2 \geq 0$$

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(CBCS)

(5th Semester)

ECONOMICS

EIGHTH (A) PAPER

(Agricultural Economics)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 10)

Tick (✓) the correct answer in the brackets provided :   1×10=10

1. Which of the following is not an agro-based industry?

   (a) Cotton industry   (   )

   (b) Iron and steel industry   (   )

   (c) Jute industry   (   )

   (d) Sugar industry   (   )

2. India rank first in the production of

   (a) meat   (   )

   (b) silk   (   )

   (c) milk   (   )

   (d) sugarcane   (   )

3. Which of the following is attributable to increase in agricultural productivity?
   (a) Mechanization ( )   (b) Urbanization ( )
   (c) Privatization ( )   (d) Disinvestment ( )

4. Under Mahalwari System of land tenure, the land was owned and cultivated by
   (a) Zamindars ( )   (b) cultivators ( )
   (c) community ( )   (d) None of the above ( )

5. Growing crops one after the other on the same field during different crop seasons is called
   (a) mixed farming ( )   (b) multiple cropping ( )
   (c) intercropping ( )   (d) strip cropping ( )

6. Consolidation of holdings refers to
   (a) the fixation of maximum limit beyond which nobody can hold any land ( )
   (b) bringing together all plots of land of cultivator in one compact block ( )
   (c) the system of land tenure in which actual tillers or cultivators also have the ownership or occupancy right ( )
   (d) None of the above ( )

7. The Father of Green Revolution is
   (a) M. S. Swaminathan ( )   (b) Norman Borlaug ( )
   (c) Verghese Kurien ( )   (d) None of them ( )

8. The Yellow Revolution is associated with the production of
   (a) meats ( )   (b) fertilizers ( )
   (c) oilseeds ( )   (d) fruits/apples ( )

9. Disguised unemployment in India is mainly related to
   (a) agricultural sector ( )   (b) industrial sector ( )
   (c) urban area ( )   (d) service sector ( )

10. The target age group of rural youth under TRYSEM which was later merged with SGSY is
    (a) 15–25 ( )   (b) 15–30 ( )
    (c) 18–30 ( )   (d) 18–35 ( )

SECTION—B

(*Marks* : 15)

Write short notes on the following :   3×5=15

1. (a) Food processing industries and agro-based industries

   OR

   (b) Distinction between farm sector and non-farm sector

2. (a) Importance of irrigation in agriculture

   OR

   (b) Distinction between Kharif and Rabi cropping seasons

3. (a) Ryotwari System of land tenures

   OR

   (b) Importance of land reforms

4. (a) Dry land farming

   OR

   (b) High-yielding variety (HYV) seeds

5. (a) Unemployment in rural India

   OR

   (b) Disguised unemployment

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. (a) Discuss the role and importance of agriculture in Indian economy. 10

OR

(b) Discuss the role and performances of livestock sector in India. Highlight the problems faced by livestock sector. 6+4=10

2. (a) Discuss the interdependence between agricultural sector and non-agricultural sector. Which according to you is more important for the development of Indian economy? 8+2=10

OR

(b) Describe the factors responsible for low productivity of agricultural sector in India. 10

3. (a) What do you mean by land reforms? What are the causes of slow progress of land reforms in India? Suggest the measures to solve the problems. 2+4+4=10

OR

(b) Describe the components of land reforms in India. Explain the main features of land reforms in India. 5+5=10

4. (a) What do you understand by the term 'Green Revolution'? Discuss the impact of Green Revolution in India. 2+8=10

OR

(b) What is meant by technology in agriculture? How did the introduction of technology into agricultural sector helps in increasing the productivity? 3+7=10

5. (a) Examine the impact of globalization on Indian agriculture. 10

OR

(b) Discuss the development of Indian agriculture in the post-WTO. 10

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