Student's Copy

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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. A cubic function may be used to describe

   (a) marginal revenue in a perfect competition   ( )

   (b) a trade cycle   ( )

   (c) average fixed cost   ( )

   (d) None of the above   ( )

1   [*Contd.*

2. A set which contains all the elements in question is

    (a) null set or empty set   (   )

    (b) finite set   (   )

    (c) universal set   (   )

    (d) equivalent set   (   )

3. The sufficient condition (second-order condition) for maximum value is

    (a) $\dfrac{d^2y}{dx^2} = 0$ (   )

    (b) $\dfrac{d^2y}{dx^2} < 0$ (   )

    (c) $\dfrac{d^2y}{dx^2} > 0$ (   )

    (d) $\dfrac{d^2y}{dx^2} \geq 0$ (   )

4. If the minimum of AC is equal to 120, then MC will be

    (a) 60   (   )

    (b) 150   (   )

    (c) 120   (   )

    (d) 0   (   )

5. The integration of the exponential function (e^x) is

    (a) $\log x + c$ (   )

    (b) $e^x + c$ (   )

    (c) $1 + e$ (   )

    (d) e^x (   )

6. Integration of any given marginal cost function will yield

   (a) total cost function ( )

   (b) average cost function ( )

   (c) demand function ( )

   (d) slope of the average cost ( )

7. The necessary condition for a square matrix A to possess an inverse is

   (a) $|A| = 0$ ( )

   (b) $|A| \neq 0$ ( )

   (c) $|A| > 0$ ( )

   (d) $|A| < 0$ ( )

8. The determinant of a matrix equals

   (a) the determinant of its transpose ( )

   (b) the transpose of its determinant ( )

   (c) the inverse of its determinant ( )

   (d) the transpose of the inverse ( )

9. Which of the following is not an assumption of linear programming problems?

   (a) Linearity ( )

   (b) Negativity ( )

   (c) Well-objective function ( )

   (d) Divisibility ( )

10. The optimal solution of all linear programmes are found at

   (a) outside the feasible region ( )

   (b) the middle of the feasible region ( )

   (c) the lowest point of the feasible region ( )

   (d) the extreme points ( )

SECTION—B

(*Marks* : 15)

Answer the following questions :

3×5=15

1. (a) Name any three uses of quadratic functions in economics.

OR

   (b) Distinguish between null and universal sets.

2. (a) Explain the differentiability of a function.

OR

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

3. (a) Distinguish between integrand and integral.

OR

   (b) If $P = 10$, $Q = 5$ and $\int f(Q) dQ = 42$, then how much is the producer's surplus?

4. (a) What is the transpose of a matrix?

OR

   (b) What is an identity matrix?

5. (a) Explain the meaning of linear programming.

OR

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

   Maximize $\qquad Z = 8x + 6y$

   subject to constraints

$$6x + 3y \leq 126$$
$$2x + 4y \leq 96$$
$$x, y \geq 0$$

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Distinguish between equal set and equivalent set. **4**

   (b) Verify the distributive law of union and intersection by using the following sets : **4**

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

   (c) In a class of 50 students, 25 students take Economics, 20 students take Mathematics and 5 take both. Find the number of students taking neither of the two subjects. **2**

OR

2. *(a)* What is the difference between dependent and independent variables? **4**

   (b) Given $S_1 = \{3, 6, 9\}$, $S_2 = \{9, 4\}$ and $S_3 = \{m, n\}$. Find the Cartesian product $S_1 \times S_2 \times S_3$. **3**

   (c) If the supply and demand functions for a commodity are $Q_d = 51 - 3P$ and $Q_s = 6P - 10$ respectively, then find the equilibrium price. **3**

3. *(a)* Find $\dfrac{dy}{dx}$ from the following functions (any *three*) : **2×3=6**

   (i) $y = (2x^2 + 3)(4x + 1)$

   (ii) $y = (2x^2 + 3x)^5$

   (iii) $y = \dfrac{x^2 + 1}{2 - x}$

   (iv) $y = 2at$ and $x = t^2 - 1$

   (b) Find the partial derivatives of the following (any *two*) : **2×2=4**

   (i) $z = (6x + 7y) / (5x + 3y)$

   (ii) $z = (3x + 5)(2x + 6y)$

   (iii) $z = 2x^2 + 3xy + 40y^2 + 100$

4. *(a)* Given the revenue function of a firm $R = 4000Q - 33Q^2$ and the total cost function $C = 2Q^3 - 3Q^2 + 400Q + 500$. Find the profit maximizing level of output. 3

(b) A firm's revenue function is given as $TR = 12Q - Q^2$. Find the marginal revenue and average revenue function. 3

(c) Describe the necessary and sufficient conditions for maximization and minimization. 4

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

(i) $\int 2x(x^2 + 1)\, dx$

(ii) $\int 8e^{2x+3}\, dx$

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

(iv) $x \log x$

(b) The marginal cost function for some product is $(1 + 2x + 6x^2)$, where x is the output. Find the total cost function when $x = 2$. 4

OR

6. *(a)* If the demand function is $p = 35 - 2x + x^2$ and the demand x_0 is 3, then what will be the consumer's surplus? 4

(b) The supply and demand function are given as $P_s = 15 + 9x$ and $P_d = 3x^2 - 20x + 5$ respectively. Find the producer's surplus. 6

7. *(a)* Given $A = \begin{pmatrix} 1 & 2 & 0 \\ 2 & -1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 1 \\ 1 & 1 \\ 0 & 2 \end{pmatrix}$. Find the product of the two matrices. 3

(b) Solve the following equations by matrix inversion method :   7

$$2x - 4y + 3z = 2$$
$$3x + 2y - z = 5$$
$$-x + 3y + z = 12$$

OR

8. (a) If $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$, then prove that $A^{-1}A = 1$.   4

(b) Solve the following simultaneous equations by Cramer's rule :   6

$$x + y - z = -1$$
$$2x + 4y + z = 6$$
$$x - 2y + 2z = 2$$

9. Use graphical method to solve the linear programming problem. Also indicate the feasible region :   8+2=10

       Minimize $C = 3x_1 + 2x_2$

subject to

$$5x_1 + x_2 \geq 10$$
$$x_1 + x_2 \geq 6$$
$$x_1 + 4x_2 \geq 12$$

and $x_2, \ x_2 \geq 0$

OR

10. What is meant by dual? Discuss various procedures involved in the formulation of linear programming problem.   2+8=10

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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 included under farm sector?

(a) Animal husbandry   (   )

(b) Quarrying   (   )

(c) Plantation   (   )

(d) Poultry   (   )

2. Which State has the largest forest cover in India?

(a) West Bengal   (   )

(b) Maharashtra   (   )

(c) Madhya Pradesh   (   )

(d) Odisha   (   )

3. The proportion of area under various/different crops at a point of time is called

   (a) dryland farming ( )
   (b) sustainable agriculture ( )
   (c) cropping pattern ( )
   (d) land use pattern ( )

4. Growing crop one after the other on the same field during different crop seasons is called

   (a) mixed farming ( )
   (b) multiple cropping ( )
   (c) intercropping ( )
   (d) truck farming ( )

5. The Computerization of Land Records (CLR) which was started in 1988–89, the object of this project was

   (a) to remove the problems existing in the manual system of maintaining and updating of records ( )
   (b) to remove the intermediaries ( )
   (c) to increase the number of landholdings by an individual ( )
   (d) to facilitate modern technology in agriculture ( )

6. Which of the following is not a measure of land reforms?

   (a) Abolition of intermediaries ( )
   (b) Ceiling on landholdings ( )
   (c) Insecurity of tenures ( )
   (d) None of the above ( )

7. Which of the following was/were a part of the Green Revolution strategy?

   (a) HYV seeds ( )
   (b) Chemical fertilizers and pesticides ( )
   (c) Irrigation ( )
   (d) All of the above ( )

8. The Golden Revolution is associated with

   (a) meats ( )
   (b) horticulture ( )
   (c) fertilizers ( )
   (d) fisheries ( )

9. The situation in which the marginal productivity of a labourer is zero or even negative is called

    (a) disguised unemployment   (   )

    (b) seasonal unemployment   (   )

    (c) frictional unemployment   (   )

    (d) industrial unemployment   (   )

10. During post WTO period (1995–2003), the share of agro-goods in India's global export

    (a) has declined   (   )

    (b) has increased   (   )

    (c) remained stagnant   (   )

    (d) None of the above   (   )

SECTION—B

(*Marks* : 15)

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

1. *(a)* Cattle wealth in India

               OR

    (b) Composition of Indian rural economy

2. *(a)* Interdependence of agriculture sector and non-agriculture sector

               OR

    (b) Importance of irrigation in agriculture

3. *(a)* Mahalwari system of land tenures

               OR

    (b) Zamindari system of land tenure

4. *(a)* Importance of technology in agriculture

               OR

    (b) Factors responsible for Green Revolution

5. *(a)* Causes of unemployment in rural India

               OR

    (b) Underemployment in agriculture

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

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

OR

(b) Discuss the importance of forest resources in Indian economy. 10

2. *(a)* Discuss the role and importance of agriculture in the development of Indian economy. 10

OR

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

3. *(a)* State the principal objectives of land reforms in India. Describe the importance of land reforms in India. 5+5=10

OR

(b) Describe the components of land reforms in India. What are the problems faced for the implementation 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 sustainable agriculture? Discuss the importance of sustainable agriculture in economic development. 3+7=10

5. *(a)* Explain the negative and positive impacts of globalization on Indian agriculture. 10

OR

(b) What are the main causes of underemployment and unemployment in rural India? Suggest important measures to solve it. 6+4=10

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(CBCS)

(6th Semester)

ECONOMICS

NINTH PAPER

(**Environmental 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. The other name for an open access property is
   (a) climate change   (   )
   (b) tragedy of the commons   (   )
   (c) resource management   (   )

2. Market failures lead to
   (a) externalities   (   )
   (b) economic efficiency   (   )
   (c) economic growth   (   )

1   [*Contd.*

3. World Environment Day is observed on

(a) 15th May ( )

(b) 5th June ( )

(c) 10th July ( )

4. The environmental Kuznets's curve takes the shape of

(a) a downward sloping straight line ( )

(b) U-shaped ( )

(c) an inverted U-shaped ( )

5. For the first time in India, the Union Ministry of Environment and Forest promulgated an EIA notification on

(a) 15 August, 1990 ( )

(b) 27 January, 1994 ( )

(c) 28 January, 1996 ( )

6. Which of the following is a direct method of environmental valuation?

(a) Contingent Valuation Method (CVM) ( )

(b) Travel Cost Method (TCM) ( )

(c) Hedonic Price Theory (HPT) ( )

7. The Central Pollution Control Board was constituted in

(a) September 1974 ( )

(b) February 1975 ( )

(c) August 1986 ( )

8. The first major Environmental Protection Act to be promulgated in India was

(a) the Water Act ( )

(b) the Forest Conservation Act ( )

(c) the Environmental Act ( )

9. Which International Agreement/Treaty is related to reduction in emission of greenhouse gas?

(a) Bonn Agreement ( )

(b) Kyoto Protocol ( )

(c) Comprehensive Test Ban Treaty (CTBT) ( )

10. Which gas is mainly responsible for global warming?

    (a) Hydrogen   (   )

    (b) Neon   (   )

    (c) Carbon dioxide   (   )

SECTION—B

(*Marks* : 15)

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

1. Common Property Resources

          OR

   Tragedy of Commons

2. Causes of Environment Degradation

          OR

   Impact of Poverty on Environment

3. Direct and Indirect Methods of Environmental Valuation

          OR

   UN Millennium Development Goals

4. State Pollution Control Board (SPCB)

          OR

   Water Pollution

5. Kyoto Protocol

          OR

   Polluter Pays Principle (PPP)

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Give a brief account of the linkages between environment and economy.   10

OR

(b) Define market failure. What are the causes of market failure in environmental economics?   2+8=10

2. *(a)* Explain the relationship between economic development and environment with the help of Kuznets's curve.   10

OR

(b) Discuss the theory of demographic transition.   10

3. *(a)* Highlight the meaning and indicators of sustainable development.   10

OR

(b) What is an Environmental Impact Assessment (EIA)? State and explain the different stages of an environmental impact assessment.   2+8=10

4. *(a)* What is meant by pollution? Explain briefly different policy instruments employed to prevent and control pollution in India.   3+7=10

OR

(b) Examine the Water (Prevention and Control of Pollution) Act, 1974.   10

5. *(a)* What are the implications of climate change? Suggest measures to mitigate climate change.   5+5=10

OR

(b) Discuss the Rio Declaration on climate change.   10

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(CBCS)

(6th Semester)

ECONOMICS

TENTH PAPER

(Quantitative Techniques—II)

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. If the lower and upper limits of a class are 10 and 40 respectively, the mid-point of the class is

    (a) 25   (   )

    (b) 20   (   )

    (c) 30   (   )

2. Pie-chart represents the components of a factor by

    (a) percentages   (   )

    (b) angles   (   )

    (c) sectors   (   )

3. The correct relationships between AM, GM and HM is

    (a) AM = GM = HM   (   )

    (b) AM ≥ GM ≥ HM   (   )

    (c) HM ≥ GM ≥ AM   (   )

4. The value which occurs with the maximum frequency on a given set of observations is

    (a) mean   (   )   *(b)* median   (   )

    (c) mode   (   )

5. If A and B are two events, the probability of occurrence of either A or B is given as

    (a) $P(A) + P(B)$ (   )   *(b)* $P(A \cup B)$ (   )

    (c) $P(A \cap B)$ (   )

6. Which of the following is a continuous distribution?

    (a) Poisson distribution   (   )

    (b) Normal distribution   (   )

    (c) Binomial distribution   (   )

7. The value of rank correlation coefficient always lies between

    (a) −1 and 0   (   )   *(b)* −1 and +1   (   )

    (c) 1 and 2   (   )

8. In a _____ the correlation between the two variables is unity.

    (a) perfect positive correlation   (   )

    (b) perfect negative correlation   (   )

    (c) Both *(a)* and *(b)*   (   )

9. Which of the following is **not** a component of time series?

    (a) Cyclical variations   (   )

    (b) Regular variations   (   )

    (c) Seasonal variations   (   )

10. Base period for an index number should be a

    (a) normal period   (   )   *(b)* year only   (   )

    (c) period at distant past   (   )

SECTION—B

(*Marks* : 15)

Answer the following questions :   3×5=15

1. (a) Define primary and secondary data.

    OR

    (b) What is meant by diagrammatic presentation of data?

2. (a) Define harmonic mean.

    OR

    (b) What is kurtosis?

3. (a) What do you understand by exhaustive set of events?

    OR

    (b) What is normal distribution?

4. (a) Define partial correlation.

    OR

    (b) Concept of coefficient of determination.

5. (a) What do you understand by seasonal variations?

    OR

    (b) What is meant by consumer price index?

(**PART : B—DESCRIPTIVE**)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

Answer **one** question from each Unit

UNIT—I

1. Differentiate between descriptive and inferential statistics. Write the uses of statistics in economics.   4+6=10

2. (a) Distinguish between Sampling and Census data.   4

   (b) Using the following data, draw a more than and less than ogives :   6

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	5	7	6	9	10	8

UNIT—II

3. Calculate the arithmetic mean and standard deviation from the following data :
5+5=10

Marks	0–10	10–20	20–30	30–40	40–50
Frequency	8	13	16	8	5

4. An analysis of the monthly wages paid to workers in two firms A and B gave the following results :

	Firm A	Firm B
Number of workers	160	150
Average wage	560	575
Variance of wage distribution	400	625

(a) In which firm is there greater variability in individual wages? 2

(b) Find out average monthly wages taken together. 3

(c) Find out combined standard deviation. 5

UNIT—III

5. *(a)* State and prove the multiplication theorem of probability. 6

(b) A bag contains 7 white, 5 black and 4 red balls. If two balls are drawn at random from the bag, find the probability that one is black and other is red. 4

6. Discuss the properties of Poisson distribution. 10

UNIT—IV

7. *(a)* What is rank correlation coefficient? 2

(b) The ranking of 10 students in two subjects A and B are as follows :

A	6	5	3	10	2	4	9	7	8	1
B	3	8	4	9	1	6	10	7	5	2

Calculate rank correlation coefficient. 8

8. From the following data, obtain the two regression equations. Also estimate the value of Y when $X = 12$: 4+4+2=10

X	6	2	10	4	8
Y	9	11	5	8	7

9. Fit a straight line trend by the method of least squares from the following data and estimate the trend value for the year 2018 : 8+2=10

Year	2010	2011	2012	2013	2014	2015	2016
Production (in 1000 tons)	76	87	95	81	91	96	90

10. Prove that the Fisher's ideal index satisfies both the time-reversal and factor-reversal tests for the following data : 5+5=10

Commodity	2018		2019	
	Price	Quantity	Price	Quantity
A	8	80	10	120
B	10	120	12	96
C	5	40	5	50
D	4	56	3	60
E	20	100	25	150

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