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UPSC
IES-ISS

Previous Year Paper
(General Economics-I)
2022

GENERAL ECONOMICS

Paper – I

| Time Allowed : **Three** Hours | Maximum Marks : **200** |

Question Paper Specific Instructions

Please read each of the following instructions carefully before attempting questions :

There are **THIRTEEN** *questions divided under* **THREE** *sections.*

The ONLY question in Section A is **compulsory***.*

In Section B, **FIVE** *out of* **SEVEN** *questions are to be attempted.*

In Section C, **THREE** *out of* **FIVE** *questions are to be attempted.*

Candidates should attempt questions / parts as per the instructions given in the sections.

The number of marks carried by a question / part is indicated against it.

Candidates are required to write clear, legible and concise answers.

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly.

Any page or portion of the page left blank in the Question-cum-Answer (QCA) Booklet must be clearly struck off.

Answers must be written in **ENGLISH** *only.*

SECTION A
(Compulsory Section)

Q1. **Answer all the following seven parts.** $5 \times 7 = 35$

(a)   Show that the ordinary demand curve will have a greater demand elasticity than the compensated demand curve.   5

(b)   Discuss the Lerner Index of monopoly power.   5

(c)   Illustrate graphically the effects of advertising on price and output in monopolistic competition.   5

(d)   Distinguish between Partial Equilibrium and General Equilibrium Approaches.   5

(e)   "The social optimal output occurs where Marginal Social Benefits (MSBs) equal Marginal Social Costs (MSCs)." Examine the statement.   5

(f)   Solve the following 2×2 game :   5

<div align="center">

Player A

	B_1	B_2
A_1	2	3
A_2	4	-1

Player B

</div>

(g)   Show that $T_{SS} = E_{SS} + R_{SS}$.   5

SECTION B

Answer any *five* out of the following seven questions :   *18×5=90*

Q2. Consider the 2-variable linear regression model :

$$Y_i = \alpha + \beta X_i + U_i, \quad i = 1, 2, ..., n,$$

where notations have their usual meanings.

(a) Estimate the parameters α and β by the OLS method. Also estimate the standard errors of these estimates.   10

(b) Describe the testing procedure of β and estimate the 95% confidence interval of β.   8

Q3. (a) Define Indirect Utility Function. Derive the Indirect Utility Function from the Direct Utility Function.   6

(b) Consider the Indirect Utility Function :

$$V = \frac{M^2}{4P_1 P_2},$$

where notations have their usual meanings.
Derive the demand functions for x_1 and x_2.   6

(c) Consider the utility function and budget equation of a consumer respectively :

$$U = x_1 x_2,$$
$$M = p_1 x_1 + p_2 x_2,$$

where notations have their usual meanings.
Derive the expenditure function of the consumer.   6

Q4. (a) Show that a monopolist produces output in the elastic range of demand.   8

(b) The demand and the total cost function of a firm respectively are given by :

$$p = 132 - 8x,$$
$$c = x^3 - 14x^2 + 69x + 128,$$

where notations have their usual meanings.

(i) Show that a monopolist produces output in the elastic range of demand.

(ii) Calculate the efficiency loss of monopoly.   4+6=10

Q5. (a) Consider the 3-variable linear regression model in deviation form :

$$y_i = \beta_2 x_{2i} + \beta_3 x_{3i} + u_i, \quad i = 1, 2, ..., n$$

u_i : spherical disturbance term

Would you estimate the parameters β_2 and β_3 ? 　　　　　　6

(b) Consider the following data :

$$\Sigma X = 20, \ \Sigma Y = 40, \ \Sigma (X - \overline{X})^2 = 40, \ \Sigma (Y - \overline{Y})^2 = 124$$

$$\Sigma (X - \overline{X})(Y - \overline{Y}) = 70, \ n = 5$$

(i) Estimate the parameters α and β of the model :

$$Y_i = \alpha + \beta X_i + U_i.$$

(ii) Estimate the standard errors of these estimates.

(iii) How would test β ?

$$(t_{0.025, 3} = 3.182)$$ 　　　　　　*4+4+4=12*

Q6. Consider an economy consisting of two consumers, one producer, one ordinary good, one public good and one primary factor. Show that Pareto optimality conditions are not valid for the public good. 　　　　　　18

Q7. (a) Explain the concept of stability and its different types. 　　　　　　6

(b) Explain the stability conditions in a single market both in the Walrasian process and Marshallian process. 　　　　　　12

Q8. (a) Consider the production function :

$$X = A L^\alpha K^\beta, \quad A, \alpha, \beta > 0,$$

where notations have their usual meanings.

A, α, β are parameters.

How would you restrict the values of α and β so that there occurs constant returns to scale and decreasing returns to scale ? 　　　　　　8

(b) Consider the production function and cost function of a competitive firm respectively :

$$X = A L^\alpha K^\beta, \quad A, \alpha, \beta > 0 \text{ and } C = wL + rK,$$

where notations have their usual meanings.

Derive the supply function of the competitive firm. 　　　　　　10

SECTION C

Answer any *three* out of the following five questions : *25×3=75*

Q9. (a) Consider the first-order autoregressive scheme in the general regression model.

How would you estimate the variance, covariance and autocorrelation coefficient of the disturbance term of the model ? 9

(b) Describe the Durbin-Watson (DW) test of autocorrelation. 7

(c) Given a sample of 50 observations and 4 explanatory variables, what can you say about autocorrelation if the computed Durbin-Watson (DW) values are :

(i) 1·05, (ii) 2·50 and (iii) 3·97 ?

$[DW_L = 1·378, DW_U = 1·721$ at 5% level of significance, n = 50, k = 4] 9

Q10. (a) Graphically explain the Lorenz curve as a measure of income inequality. 5

(b) How would you derive the Gini coefficient from the Lorenz curve ? 10

(c) How would you derive the Gini coefficient from the Pareto law of income distribution ? 10

Q11. (a) "It is not possible to construct social preferences from individual preferences without violating one or more of the five axioms." Examine the statement given by Arrow. 12

(b) Consider the economy with two goods and fixed factor supplies. Assume that the social welfare function defined in commodity space :

$$w = (x_1 + 2) x_2$$

and that society's implicit production function

$$x_1 + 2x_2 - 1 = 0.$$

Find the values of x_1 and x_2 that maximize social welfare. 6

(c) Explain 'Compensation Principle' and 'Test Criteria' formulated by Hicks-Scitovsky. 7

Q12. (a) What is the Leontief inverse matrix ? What are the mathematical properties of it ?   7

(b) State and prove graphically the Hawkins-Simon condition in case of 2×2 industries in the static open input-output model. Give an economic interpretation of it.   10

(c) Consider the Leontief input coefficient matrix :

$$A = \begin{bmatrix} 0 \cdot 1 & 0 \cdot 2 & 0 \cdot 2 \\ 0 \cdot 2 & 0 \cdot 4 & 0 \cdot 1 \\ 0 \cdot 3 & 0 \cdot 1 & 0 \cdot 6 \end{bmatrix}$$

    (i) Test the viability condition of the system.

    (ii) Test the properties of Leontief inverse.   8

     6

Q13. (a) Show that MC cuts ATC at its lowest point.

(b) The short-run cost function of a competitive firm is given by

$$c = 0 \cdot 1x^3 - 2x^2 + 15x + 10,$$

where notations have their usual meanings.

Derive the short-run supply function of the firm.   8

(c) Show that the elasticity of demand is the same at all points on the demand curve :

$$x = ap^{-\alpha}$$

a, α : parameters

x : quantity demand

p : price   5

(d) Consider the demand function of two goods, x_1 and x_2 respectively :

$$x_1 = p_1^{-0 \cdot 7} \, p_2^{0 \cdot 2}$$

and $x_2 = p_1^{0 \cdot 6} \, p_2^{-0 \cdot 4}$,

where p_1 and p_2 are prices of x_1 and x_2 respectively.

Determine whether the commodities are complementary or competitive.   6