UPSC
IES/ISS

Previous Year Paper

(General Econ.) Paper-I

22 June, 2024

I.E.S/ I.S.S. Examination, 2024 **SGSE–P–GNM**

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)

1. Answer all the following *seven* parts : 5×7=35

(a) If the demand function is $P = (4 - 0 \cdot 5q)^2$, for what value of q will the price elasticity of demand be unity?

(b) If a production function is homogeneous of degree 1, following CRS, show that the marginal productivity and average productivity functions are independent of the absolute amounts of the inputs, but depend upon the input ratios.

(c) Explain the 'peak load pricing' with reference to power sector. In what way will it increase economic efficiency?

(d) Distinguish between Ricardo and Kalecki theories of distribution.

(e) Define Hicks-Kaldor compensation principle. What are the main criticisms against this compensation principle?

(f) Show that the production function $Q = \log(L^{\beta_1} K^{\beta_2})$ is concave for all $\beta_1, \beta_2 > 0$.

(g) Specify an orthogonal factor model by mentioning the underlying assumptions of the model.

SECTION—B

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

2. *(a)* In a two-commodity framework, what will be the shape of the indifference curve when—

(i) one commodity is 'bad';

(ii) one commodity is 'neutral' ?

Explain your answer. 8

(b) State and prove the Slutsky's theorem. Derive the demand curve for a Giffen good by using this theorem. 10

3. *(a)* Write down the major characteristics of a translog production function. In what ways is this production function different from Cobb-Douglas production function? 10

(b) Suppose that the production function of a firm is given as $Q = AL^{1/3} K^{2/3}$.

(i) Find out the returns to scale of this production function.

(ii) Is the production process labour-intensive?

(iii) If the prices of L and K are ₹ 20 and ₹ 100 respectively and the firm incurs total cost ₹ 1,050, what will be the optimal combination of L and K? 8

4. *(a)* Formulate the dual form of the following problem relating to production by a rational firm :

$$\text{Maximize} \quad \pi = p'x$$
$$\text{subject to} \quad Ax \leq b$$
$$\text{and} \quad x \geq 0$$

where

π is the total profit

p' is the row vector of order 1×2 of output prices

x is the column vector of order 2×1 of output produced

A is the coefficient matrix of order 2×2

Give economic interpretations of the dual problem. Give a Lagrange's multiplier interpretation to the optimal values of the dual choice variables. 4+3+3=10

(b) Consider the following utility function :

$$u = q_1 q_2^2$$

Derive the compensated demand function for q_1. Show that this demand curve is always negatively sloped. 5+3=8

5. *(a)* Price index can be defined as a weighted average of price relatives. Find out the formulae for the Laspeyres and Paasche price index by taking appropriate weights. Write down the merits and demerits of these indices. 8

(b) Suppose that you have got the following estimated results in estimating a relationship between Y and X in a dynamic framework :

$$y_t = 2 \cdot 7 + 0 \cdot 6x_t + 0 \cdot 05 y_{t-1}$$
$$(0 \cdot 392) \quad (0 \cdot 004)$$
$$R^2 = 0 \cdot 989, \quad \text{DW} = 0 \cdot 06$$

[The figures in parentheses show standard errors]

In your estimation even R^2 is very high, the results are useless. Explain why this estimation is useless. 5

(c) "Univariate regression analysis is more meaningful with time series data than with cross-section data." Discuss. 5

6. (a) "Multiple linear regression model can consider the ceteris paribus effect, while simple linear regression model fails to do it." Explain the validity of this statement. 4

(b) In a two-regressor multiple linear regression model $Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$, the estimated coefficients are

$$\hat{\beta}_1 = \frac{S_{1y} S_{22} - S_{2y} S_{12}}{S_{11} S_{22} - S_{12}^2}$$

$$\hat{\beta}_2 = \frac{S_{2y} S_{11} - S_{1y} S_{21}}{S_{11} S_{22} - S_{12}^2}$$

where

$$S_{jy} = \sum_i (X_{ij} - \bar{X}_j)(Y_i - \bar{Y})$$
$$S_{jj} = \sum_i (X_{ij} - \bar{X}_j)^2$$
$$S_{jk} = \sum_i (X_{ij} - \bar{X}_j)(X_{ik} - \bar{X}_k)$$

How do you interpret $\hat{\beta}_1$ and $\hat{\beta}_2$? 6

(c) Write down the desirable properties of a good index of inequality. Discuss whether Gini index satisfies all the desirable properties. 8

7. *(a)* State Euler's theorem. Use this theorem to explain product exhaustion problem. 8

(b) Explain how factor prices are determined under bilateral monopoly. 10

8. *(a)* What do you mean by market failure? Explain it with a real world example. 8

(b) *(i)* Write down the behavioural assumptions on Walrasian and Marshallian stability analysis.

(ii) Derive the conditions for Walrasian and Marshallian stability.

(iii) Show that these two conditions cannot be fulfilled together when the demand and supply curve both have negative slope. 3+4+3=10

SECTION—C

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

9. *(a)* Both the marginal utility approach and the indifference curve approach yield the same equilibrium position for a rational consumer. Discuss the relative advantages of the indifference curve approach over the marginal utility approach. 8

(b) Show that demand has unitary price elastic if the price consumption curve is horizontal. 7

(c) Suppose that a consumer in a two-commodity (X, Y) world has linear indifference curve with a slope equal to $-\frac{1}{2}$. Find out the equilibrium consumption when prices for both commodities equal to 2 ($P_X = P_Y = 2$) and income level of the consumer is ₹ 2,000. How does equilibrium bundle change when $P_X = 1$ and $P_Y = 4$ with the same level of income?

[Assume that the consumer spends all income on these two commodities only] 10

10. *(a)* Suppose that the sample observations on price (X) and supply (Y) of a commodity reveal that Y is increasing faster than X implying the non-linear relationship between X and Y. How do you specify a linear regression model to estimate this supply function? Give reasons. Write down the economic interpretation of the regression coefficient. What are the major components involved in the random error of this regression model? 15

(b) In a linear regression model $Y = \beta_0 + \beta_1 X + u$, the variance of the regression coefficient $\hat{\beta}_1$ varies inversely with the variance of X. What are the implications of this result? If the sample mean $\overline{X}$ is zero, show that the $\text{cov}(\hat{\beta}_0, \hat{\beta}_1) = 0$, where $\hat{\beta}_0$ and $\hat{\beta}_1$ are the OLS estimates of β_0 and β_1. 10

11. *(a)* Show that in finding the AM of 100 readings on temperature, it does not matter whether it is measured in Centigrade or Fahrenheit scale, but it matters in finding the GM. 10

(b) Show that correlation coefficient between two variables X and Y can be interpreted as the proportion of the total variability of Y which is accounted for by its linear regression on X. 7

(c) Consider the following two-sector economy :

Sectors	I	II	*Final consumption*
I	100	100	50
II	120	80	80

Calculate the Leontief inverse of this hypothetical two-sector economy after formulating the open Leontief model. Interpret the coefficients of this matrix properly. If the final consumption demand changes to 100 units for sector I, and 50 units for sector II, what would be the new production levels in sector I and sector II ? 8

12. *(a)* Show the conditions that ensure efficient distribution of a given combination of products between two consumers. Would the same conditions ensure maximum equity? 15

(b) Compare the social choice theories of Ronald Coase and Amartya Sen. 10

13. *(a)* Explain the following pricing rules of public sector enterprises :

(i) Pricing of public utility services

(ii) Marginal cost pricing rule

(iii) No-profit no-loss policy

(iv) Profit price policy 10

(b) Show that the long-run average cost curve is an envelope of the short-run average cost curves. What will be the shape of the long-run average cost curve under increasing returns to scale? Explain your answer. 15

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