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 : **5×7=35**

(a) Define MRS (Marginal Rate of Substitution). Calculate MRS for a utility function $U = q_1^{\alpha} q_2^{\beta}$. 5

(b) Specify the Cobb-Douglas production function taking two inputs in producing one output. Interpret the parameters used in this function. 5

(c) Comment on the role of conjectural variations in the determination of oligopoly equilibrium. 5

(d) "Rent is not the income of a particular factor of production but merely an aspect of income of any factor of production." Discuss. 5

(e) State and explain the Coase theorem. 5

(f) Write down the economic meaning of a first order derivative of a short-run production function. Interpret the situation where one second order derivative of that function is zero. 5

(g) Explain why adjusted R^2 is important for testing the goodness of fit of a regression model. 5

SECTION B

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

Q2. (a) How can an ordinary demand function be derived in a two-commodity framework ? Show that the ordinary demand function is homogeneous of degree zero with respect to all prices and income. *10*

(b) A consumer is observed to purchase $x = 10$, $y = 5$ at prices $P_x = 1$ and $P_y = 3$. The consumer is also observed to purchase $x = 9$, $y = 3$ at $P_x = 2$, $P_y = 2$. Is the behaviour of the consumer consistent with axioms of revealed preference ? *8*

Q3. (a) How do you construct the long-run average cost curve from short-run average cost curves ? Explain why an average cost curve is U-shaped under variable returns to scale. *8*

(b) Derive the necessary and sufficient conditions for a firm's equilibrium in producing a good by using two inputs at a given cost. Illustrate your answer graphically. *10*

Q4. (a) Explain the concepts of horizontal, vertical and conglomerate merger of firms with suitable examples. Discuss one objective briefly in each case. *6*

(b) "Asymmetric information does not cause an efficiency problem, but it does have equity implications." Discuss critically. *6*

(c) What do you mean by free rider problem ? Explain how the free rider problem makes the private provision of public goods inefficient. *6*

Q5. (a) Why is an input demand called a derived demand ? Explain graphically how factor prices are determined when the product market is a monopoly and the factor market is perfectly competitive. *8*

(b) Critically examine the Marxian theory of distribution and explain how it differs from Kaldor's theory of distribution. *10*

Q6. (a) Define externalities in the context of public goods. Explain how externalities affect the efficiency of market outcomes. *10*

(b) Explain the main features of Sen's theory of social choice. How is it relevant in the present situation ? *8*

Q7. (a) Define feasible solution, basic feasible solution and optimal solution of linear programming problem. Explain these concepts by taking hypothetically, a constrained minimisation problem. *9*

(b) Solve the following constrained profit maximisation problem by using graphical method. *9*

Maximise $\pi = 4x_1 + 3x_2$

subject to $x_1 + 2x_2 \leq 8$

$x_1 \leq 6$

$x_2 \leq 3$

$x_1, x_2 \geq 0$

Q8. (a) Define rank of a matrix. Write down the implications of the full rank assumption of a multiple linear regression model. Why is full rank assumption not required for a simple linear regression model ? *2+3+3=8*

(b) Explain the concept of eigenvalues and eigenvectors associated with a square symmetric matrix. How are these concepts used in principal component analysis ? *5+5=10*

SECTION C

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

Q9. (a) Explain the meaning of Nash equilibrium in the context of firms competing with each other with respect to price. Why is the equilibrium stable ? Why can the firms not raise prices to the level that maximises joint profits ? *3+3+4=10*

(b) Under what condition is an economic agent called a risk averter ? State and prove the Neumann-Morgenstern expected utility theorem. *3+6=9*

(c) Suppose that an economic agent has 4 choice options A_1, A_2, A_3 and A_4, which follow the transitivity rule (A_1 is preferred to A_2, A_2 is preferred to A_3, A_3 is preferred to A_4) as well as Neumann-Morgenstern axioms involving risk. Find out the expected utilities if the agent is indifferent between :

(i) A_2 and a lottery ticket with probabilities of 0·4 and 0·6 for A_1 and A_4.

(ii) A_3 and a lottery ticket with probabilities of 0·3 and 0·7 for A_2 and A_4.

Assume that $U(A_1) = 300$ and $U(A_4) = 100$. *6*

Q10. (a) "A monopolist cannot increase price level indefinitely." Explain. What would be the price if the government wants to set a price ceiling that maximises the monopolist's output ? *8*

(b) "The competitors will match the price reduction more closely than the price increase." Explain the reasons by using the kinked demand curve model. How is the problem of prisoner's dilemma associated with the duopoly model ? *8*

(c) Construct the compensated demand function from one utility function $U = q_1^{\alpha} \cdot q_2$, where q_1 and q_2 are the quantities of two goods, and U is the level of utility. Explain the shape of this demand curve. What would be the optimum expenditure function in this problem ? *5+2+2=9*

Q11. (a) Explain graphically why there is no supply curve in a monopoly market. *7*

(b) What is market signalling ? Distinguish between separating equilibrium and pooling equilibrium in this context. Which equilibrium is efficient ? Justify your answer. *8*

(c) Explain the pricing policy of public sector enterprises by using long-run marginal cost based price. How is it different from public utility and rate of return approaches ? *10*

Q12. (a) The following table shows the coefficient matrix of an economy consisting of three industries, each producing for their internal use as well as for external demand by the consumers :

Industry	I	II	III
I	0·20	0·25	0·10
II	0·15	0·10	0·05
III	0·10	0·05	0·15

(i) Interpret each row and each column of the matrix.

(ii) Calculate Leontief Inverse Matrix.

(iii) What should be the required output by each industry to meet the external demand given by the following matrix ?

$D' = [40 \quad 50 \quad 60]$ *5+5+5=15*

(b) Explain the role of random error in an econometric model. Differentiate between error and residual in the context of a linear regression model. *5*

(c) State the Lorenz dominance principle. How is the Gini Coefficient related to the Lorenz curve ? *5*

Q13. (a) Distinguish between seasonal fluctuation and cyclical fluctuation of a time series variable. Describe a method of deseasonalisation of time series data. Why should you deseasonalise the data in estimating linear trend of a seasonal time series variable ? *3+3+3=9*

(b) Write down the basic principles of Ordinary Least Squares (OLS) and Maximum Likelihood Estimates (MLE) in estimating a linear regression model. [You can consider a regression model $Y = X\beta + \varepsilon$ in explaining your answer] *4+4=8*

(c) Explain why the presence of heteroscedasticity in a dataset creates a problem in estimating a linear regression model. Suggest an appropriate method of estimation if heteroscedasticity presents in the data. Why is the problem of heteroscedasticity most likely to appear in a cross-section data, and not in time series data ? *3+3+2=8*