Paper IV : ADVANCED ECONOMIC THEORY

(w.e.f. 2003 – 2004)

SECTION 1

1. **Pricing under Imperfect Competition:** Monopolistic Competition – Price output decisions under monopolistic competition – Chamberlin's alternative approach.

   Pricing under Oligopoly: Cournot's model of oligopoly.

   Kinky demand curve hypothesis – Collusive agreements Price leadership – Concepts in game theory.

2. **Pricing of Factors of Production and Income Distribution:** Factor pricing in perfectly competitive markets – Factor pricing in imperfect competitive markets - Modern theory rent – Wage determination under collective bargaining – Bilateral monopoly – Lonable funds theory of interest Risks, uncertainty and profits.

3. **General Equilibrium and Social Welfare: Interdependence in the economy** – General equilibrium and its existence – The Pareto optimality criterion of social welfare – Marginal conditions for a Pareto optimal resources allocation – Perfect competition and Pareto optimality.

4. **Post Keynesian Theories of Consumption :** Permanent income hypothesis – Absolute income hypothesis – Relative income hypothesis – Life cycle hypothesis.

Section II

5. **IS-LM Curve Model:** Money market equilibrium (the LM curve) – Product market equilibrium (the IS curve) Equilibrium in the IS-LM curve model – Factors affecting equilibrium income and the interest rate (monetary influences and real influences_ - Relative effectiveness of monetary and fiscal policy.

6. **Phillips Curve Analysis:** Relationship between inflation and unemployment in the short-run and in the long-run.

7. **Public Finance :** Allocation of resources – Provision of public goods and merit goods – Benefit and ability to pay approaches - Trade-off between equity and efficiency.

Wagner's law of increasing state activities; Wiesman-Peacock hypothesis – Social cost – Benefit analysis:

8. **International Trade**: Theories of international trade Classical and modern – Measurement of gains from trade and equilibrium terms of trade Flexible exchange rates Disequilibrium in balance of payments – Corrective measures

Concept of currency crisis.

ECONOMIC GROWTH AND DEVELOPMENT

Preamble : In the syllabus, wherever reference is made to developing countries, topic should be taught in the context of India.

SECTION – 1

1. **Economic Growth and Development** : Meaning and distinction of growth and development – Measures of economic growth and development – Factors affecting economic growth and development – Characteristics of LDCs.
2. **Theories of Economic Growth and Development:** Schumpeter's theory of economic development – The big push theory – Rostow's stages of growth – The Harrod-Domar growth model.
3. **Sectoral View of Development:** Relative role of agriculture, industry and services sectors in economic development with reference to India – The Lewis model – Impact of globalization on agriculture, industry and services – Technical progress and appropriate technology – Terms of trade between agriculture and industry – Role and significance of infrastructure in economic development.
4. **Human Resource Development:** Population growth in the development process – Theory of Human Capital (Schultz approach) – Human Development Index (HDI), General Development Index (GDI) and Physical Quality of Life Index

(PQLI) – The contribution of education, health and nutrition to growth and development – Human resource policies.

SECTION - II

5. **Macro Economic Policy and Economic Development:** Role of monetary and fiscal policies in the developing economies – Sources of capital formation: Domestic and External – Role of aid vs. trade, FDI, MNCs, IMF, World Bank (with respect to developing countries).
6. **Role of State:** Arguments for and against planning - Role and limitations of public sector enterprises – Changing state policy – Disinvestments policy in India.
7. **Environment and Ecology:** Environment economy linkage Environment as a necessity and luxury Population environment linkage – Environmental use and environmental disruption as an allocation problem – Environment as a public good – Market failure for environmental goods.
8. **Pollution Control:** Prevention, control and abatement of pollution – Choice of policy instruments in developing countries – Environmental legislation – Indicators of sustainable development.

PAPER VII (A) ELEMENTARY MATHEMATICS AND STATISTICS FOR ECONOMIC ANALYSIS

Section – I

Module 1: Set theory, functions, limits and continuity:

1.1 **Set theory, functions and relations**:

Concept of a set, Types

Fundamental Set Operations with Venn diagrams: Union, Intersection, Complement.

De Morgan's Law

Cartesian products of sets and relations

Properties of Binary Relations.

Concept of Functions:

Algebraic (with graphical solution): Constant, Linear, Quadratic and Cubic.

Non-Algebraic: Logarithmic and Exponential (only concepts).

Inverse of function

Application to Economic Theory:

Demand, supply, Market Equilibrium, Effects of Taxation and Subsidy on Equilibrium Price

Saving, Investment, Consumption, Income and Government expenditure.

(Using basic Structural Identities).

1.2 **Limits and Continuity**:

Limit of a function: at a point, over an interval

Limit of Algebraic functions

Limit of Non-Algebraic functions: Logarithmic and Exponential functions.

Continuity and discontinuity at a point and over an interval.

Module 2: Differentiation:

Concept of derivative as a slope of a curve.

Derivatives of Algebraic, Exponential and Logarithmic functions including: Product Quotient and Chain rule with numerical applications.

Unconstrained Optimisation Techniques with economic applications to profit maximization, cost minimization and related problems.

Partial differentiation of functions:

Total differentiation

Homogeneous functions

Euler's Theorem

Cobb Douglas Production Function: Returns to Scale

Constrained optimization of the Utility and Production

Functions with numerical applications.

Module 3: Integration

Integration of a function: indefinite functions of algebraic, exponential and logarithmic functions,

Definite Integrals with application

Economic Applications:

Revenue and Cost functions

Consumer's and Producer's Surplus

Learning Curve

Coefficients of Income Inequility: Pareto's and Gini coefficient.

Module 4: Linear Algebra:

Matrices and Determinants:

Types of Matrices

Elementary Operations : Addition, Subtraction, Multiplication and Inverse of a Matrix.

Concept of Determinant and its evaluation for (2 x 2), (3 x 3) case.

Cramer's Rule

Input-Output Analysis

Structure of a Linear Programming Problem: Objective function, Set of constraints and Non-Negative constraints.

Graphical solution

Formulation of the dual of a Linear Programming Problem.

Section II

Module 5: Basic Statistical Concepts and Measures of Central Tendency.

5.1 **Basic Statistical Concepts**:

The concepts of primary and secondary data, varieties and attributes population and samples with numerical illustrations.

Graphical presentation of data: Histograms, Frequency, Polygons and Ogives.

5.2 **Measures of Central Tendency**:

Computation of arithmetic mean, median and mode from raw data. Ungrouped and Grouped (tabulated data)

Properties of an ideal average.

5.3 Measures of Dispersion:

Absolute and Relative: Range and Coefficient of range

Quartile deviation and coefficient of quartile deviation

Standard deviation and coefficient of variation

Concept of Skewness and Kurtosis.

Relationship Model

Meaning and types of correlation

Determination of Correlation by: Scatter diagram, Karl Pearson's product moment, Spearman's Rank correlation (including repeated ranks).

Regression: Concept of Least Squares and Lines of Regression.

Coefficient of correlation from regression parameters.

Module 7: Time Series and Index Numbers:

7.1 **Time Series:**

Components of Time Series : Secular trend, Seasonal component, Cyclical and Irregular Component

Measurement of Trend:

Method of moving averages

Least square method

Trend forecasting.

7.2 **Index Numbers:**

Simple and Weighted Index Numbers

Average of Price Relatives

Fixed base and Chain base Index Numbers

Laspeyere's Paasche's and Fisher's Price Index Numbers

Cost of Living Index Numbers

Problems involved in the construction of Index Numbers

Uses of Index Numbers.

Module 8: Probability:

Concept : Experiment, Sample Space, Events, Random Variable, Probability of an Event, Permutation, Combination, and Fundamental Principle.

Mathematical Expectation, Variance

Addition and Multiplication Theorem

Conditional Probability.

Binomial and Normal Distribution.

PAPER VIII (A) INTRODUCTION TO ECONOMETRICS

Section I

Module 1: Elements of Probability:

Random variables and probability distributions

Bivariate probability distribution

Mathematical Expectation and Variance

Probability distributions: Binomial, Poisson and Normal distributions along with their uses.

Law of Large Numbers and Central Limit Theorem (without proof).

Module 2: Sampling and Statistical Inference:

Statistical Inference: Concept and Nature

Theory of Estimation: Point and interval Estimation

Desirable properties of a point estimator

Confidence interval and Confidence limits.

Statistical Hypothesis: Null and Alternative Hypothesis

Simple and Composite Hypothesis Problem of testing of Hypothesis and error in decision making: Type I and Type II error, Level of significance, Tests of significance.

Test of significance based on: Large sample test and small sample tests – z and student's distribution.

(Population mean and difference between two means)

Chi – square for specified value of population variance and goodness of fit.

Module 3: Econometric Methods and Models:

Definition and scope of econometrics

Relationship between Econometrics, Mathematical Economics and Statistics.

Nature of Econometric Approach.

Methodology of Econometric Approach.

Econometric Models.

Types and Forums of models: Endogenous and Exogenous variables.

Structural and Reduced form – Identification Problem.

Module 4 : Regression Analysis:

Concept of regression

Two variable regression analysis : Concept of Population Regression Function (PRF)

Stochastic specification of the PRF, Nature of the Stochastic disturbance term, Sample Regression Function (SRF), Method of Ordinary Least Squares (OLS), Precision of Standard Errors of Least Squares estimate,

Properties of the Least Square Estimator : The Gauss Markov Theorem.

The coefficient of determination r^2 : a measure of 'goodness of fit; (ANOVA)

Extension (without proof) to the three variable case: formulation of the general linear model in the matrix form, Tests based on Student's t and F distribution.

Section II

Module 5: Probs. & Applications of Single Equation Models.

Autocorrelation, Heteroscedasticity and Multicollinerarity: Nature of the problem, consequences, detection and remedial measures.

Statistical estimation of demand function based on cross section data :Engle's curve.

Econometric issues in the statistical estimation of demand function.

Module 6: Input-Output Analysis:

The inter-industry accounting system: Input- Output technological coefficients.

Assumptions of Input-Output analysis: The sector, the input function.

Static and Dynamic models

Hawkins – Simon condition

Module 7 : Linear Programming:

Concept of objective functions, set of constraints, non-negative constraints

General formulation of a Linear Programming Problem (LPP).

Methods of Solution:

Graphical method: Maximisation and Minimisation along with special cases:

Degenerate optimal (Redundant constraints), Multiple optimal, Non-feasible solution and Unbounded optimal solution.

Simplex Method: The Big M method.

The Transportation problem as a special case of LPP: Methods of Initial Basic Feasible Solution using: North-West Corner Method, the Least Cost Method and Vogel's Approximation Method.

Module 8: Game Theory:

Concept of game, strategy, two person zero sum game, pay-off matric, maximin and minmax principles, saddle point, Nash equilibrium.

Pure strategies

Mixed strategies: Graphical solution so mixed strategies.