Standard and Syllabus for UPSC Indian Economic / Statistical Services Examination

The standard of papers in General English and General Studies will be such as may be expected of a graduate of an Indian University.

The standard of papers in the other subjects will be that of the Master's degree examination of an Indian University in the relevant disciplines. The candidates will be expected to illustrate theory by facts, and to analyse problems with the help of theory. They will be expected to be particularly conversant with Indian problems in the field of Economic/Statistics.

General English

Candidates will be required to write an essay in English. Other questions will be designed to test their understanding of English and workmanlike use of words. Passages will usually be set for summary or precis.

General Studies

General Knowledge including knowledge of current events and of such matters of every day observation and experience in their scientific aspects as may be expected of an educated person who has not made a special study of any scientific subject. The paper will also include questions on Indian Polity including the political system and the Constitution of India, History of India and Geography of a nature which the candidate should be able to answer without special study.

General Economics-I

PART A:

1. Theory of Consumer's Demand: Cardinal utility Analysis; Marginal utility and demand, Consumer's surplus, Indifference curve Analysis and utility function, Price income and substitution effects, Slutsky theorem and derivation of demand curve, Revealed preference theory. Duality and indirect utility function and expenditure function, Choice under risk and uncertainty.

2.Theory of Production: Factors of production and production function. Forms of Production Functions: Coble-Douglas, CES and Fixed coefficient type, Translog production function. Laws of return, Returns to scale and Return to factors of production. Duality and cost function, Measures of productive efficiency of firms, technical and allocative efficiency. Partial Equilibrium versus General Equilibrium approach. Equilibrium of the firm and industry.

3. Theory of Value: Pricing under different market structures, public sector pricing, marginal cost pricing, peak load pricing, cross-subsidy free pricing and average cost pricing. Marshallian and Walrasian stability analysis. Pricing with incomplete information and moral hazard problems.

4. Theory of Distribution: Neo classical distribution theories; Marginal productivity theory of determination of factor prices, Factor shares and adding up problems. Euler's theorem, Pricing of factors under imperfect competition, monopoly and bilateral monopoly. Macro-distribution theories of Ricardo, Marx, Kaldor, Kalecki.

5. Welfare Economics: Inter-personal comparison and aggregation problem, Public goods and externality, Divergence between social and private welfare, compensation principle. Pareto optimality. Social choice and other recent schools, including Coase and Sen and Game theory.

PART B: Quantitative Methods in Economics:

1. Mathematical Methods in Economics: Differentiation and Integration and their application in economics. Optimisation techniques, Sets, Matrices and their application in economics. Linear algebra and Linear programming in economics and Input-output model of Leontief.

2. Statistical and Econometric Methods: Measures of central tendency and dispersions, Correlation and Regression. Time series. Index numbers. Sampling and Survey methods. Testing of hypothesis, simple non-parametric tests. Drawing of curves based on various linear and non-linear function. Least square methods and other multivariate analysis (only concepts and interpretation of results). Analysis of Variance, Factor analysis, Principle component analysis, Discriminant analysis. Income distribution: Pareto law of Distribution, lognormal distribution, measurement of income inequality. Lorenze curve and Gini coefficient.

GENERAL ECONOMICS-II

1. Economic Thought: Mercantilism Physiocrats, Clasical, Marxist, Neo-classical, Keynesian and Monetarist schools of thought.

2. Concept of National Income and Social Accounting: Measurement of National Income, Inter relationship between three measures of national income in the presence of the Government sector and International transactions. Environmental considerations, Green national income.

3. Theory of employment, Output, Inflation, Money and Finance: The Classical theory of Employment and Output and Neo classical approaches. Equilibrium, analysis under classical and neo classical analysis. Keynesian theory of Employment and output. Post Keynesian developments. The inflationary gap; Demand pull versus cost push inflation, the Philip's curve and its policy implication. Classical theory on Money, Quantity theory of Money. Friedman's restatement of the quantity theory, the neutrality of money. The supply and demand for loanable funds and equilibrium in financial markets, Keynes' theory on demand for money.

4. Financial and Capital Market: Finance and economic development, financial markets, stock market, gift market, banking and insurance. Equity markets, Role of Primary and Secondary markets and efficiency, Derivatives markets; Futures and options.

5. Economic Growth and Development: Concepts of Economic Growth and Development and their measurement: characteristics of less developed countries and obstacles to their development – growth, poverty and income distribution. Theories of growth: Classical Approach: Adam Smith, Marx and Schumpeter – Neo classical approach; Robinson, Solow, Kaldor and harrod Domar. Theories of Economic Development, rostow, Rosenstein-Roden, Nurske, Hirschman, Leibenstien and Arthur Lewis, Amin and Frank (Dependency school) respective role of the state and the market. Utilitarian and Welfariest approach to social development and A K Sen's critique. Sen's capability approach to economic development. The Human Development Index. Physical quality of Life Index and Human Povery Index.

6. International Economics: Gains from International Trade, Terms of Trade, policy, international trade and economic development – Theories of Internal Trade; Ricardo, Haberler, Heckcher-Ohlin and Stopleer-Samuelson – Theory of Tariffs – Regional Trade Arrangements.

7. Balance of Payments: Disequilibrium in Balance of Payments, Mechanism of Adjustments, Foreign Trade Multiplier, Exchange Rates, Import and Exchange Controls and Multiple Exchange Rates.

8. Global Institutions: UN agencies dealing with economic aspects, World Bank, IMF and WTO, Multinational Corporations.

GENERAL ECONOMICS-III

1. Public Finance: Theories of taxation: Optimal taxes and tax reforms, incidence of taxation; Theories of public expenditure: objectives and effects of public expenditure, public expenditure policy and social cost benefit analysis, criteria of public investment decisions social rate of discount, shadow prices of investment, unskilled labour and foreign exchange. Budgetary deficits. Theory of public debt management.

2. Environmental Economics: Environmentally sustainable development, Green GDP, UN Methodology of Integrated Environmental and Economic Accounting. Environmental Values: Users and non-users values; option value. Valuation Methods: Stated and revealed preference methods. Design of Environmental Policy Instruments: Pollution taxes and pollution permits, collective action and informal regulation by local communities. Theories of exhaustible and renewable resources. International environmental agreements. Climatic change problems. Kyoto protocol, tradable permits and carbon taxes.

3. Industrial Economics: Market structure, conduct and performance of firms, product differentiation and market concentration, monopolistic price theory and oligopolistic interdependence and pricing, entry preventing pricing, micro level investment decisions and the behavior of firms, research and development and innovation, market structure and profitability, public policy and development of firms.

4. State, Market and Planning: Planning in a developing economy. Planning regulation and market. Indicative Planning. Decentralised Planning.

INDIAN ECONOMICS

1. History of Development and Planning: alternative Development Strategies – goal of self reliance based on import substitution and protection, the post 1991 globalisation strategies based on stabilization and structural adjustment packages: fiscal reforms, financial sector reforms and trade reforms.

2. Federal Finance: constitutional provisions relating to fiscal and financial powers of the states, Finance Commissions and their formulae for sharing taxes, Financial aspect of Sarkaria Commission Report, financial aspects of 73rd and 74th constitutional Amendments.

3. Poverty, Unemployment and Human Development: Estimates of inequality and poverty measures for India, appraisal of Government measures, India's human development record in global perspective. India's population policy and development.

4. Agriculture and Rural Development Strategies: Technologies and institutions, land relations and land reforms, rural credit, modern farm inputs and marketing – price policy and subsidies; commercialization and diversification. Rural development programmes including poverty alleviation programmes, development of economic and social infrastructure and New Rural Employment Guarantee Scheme.

5. India's experience with Urbanisation and Migration: Different types of migratory flows and their impact on the economies of their origin and destination, the process of growth of urban settlements; urban development strategies.

6. Industry: Strategy of Industrial development: Industrial Policy Reforms; Reservation Policy relating to small scale industries. Competition policy, Sources of industrial finances. Bank, share market, insurace companies, pension funds, non-banking sources and foreign direct investment, role of foreign capital for direct investment and portfolio investment, Public Sector reform, privatization and disinvestments.

7. Labour: Employment, unemployment and under-employment, industrial relations and labour welfare – strategies for employment generation – Urban labour market and informal sector employment, Report of National Commission on Labour, Social issues relating to labour e.g. Child Labour, Bonded Labour, International Labour Standard and its impact.

8. Foreign Trade: Sailent features of India's foreign trade, composition, direction and organization of trade, recent changes in trade policy, balance of payments, tariff policy, exchange rate, India and WTO requirements.

9. Money and Banking: Financial sector reforms, Organisation of India's money market, changing roles of the Reserve Bank of India, commercial banks, development finance institutions, foreign banks and non-banking financial institutions, Indian capital market and SEBI, Development in Global Financial Market and its relationship with Indian Financial Sector.

10. Inflation: Definition, trends, estimates, consequences and remedies (control): Wholesale Price Index, Consumer Price Index: components and trends.

11. Budgeting and Fiscal Policy: Tax, expenditure, budgetary deficits, pension and fiscal reforms, Public debt management and reforms, Fiscal Responsibility and Budget Management (FRBM) Act, Black money and Parallel economy in India – definition, estimates, genesis, consequences and remedies.

Statistics-I

(i) Probaility

Elements of measure theory, Classical definitions and axiomatic approach. Sample space. Class of events and Probability measure. Laws of total and compound probability. Probability of m events out of n. Conditional probability, Bayes' theorem. Random variables - discrete and continuous. Distribution function. Standard probability distributions - Bernoulli, uniform, binomial, Poisson, geometric, rectangular, exponential, normal, Cauchy, hypergeometric, multinomial, Laplace, negative binomial, beta, gamma, lognormal and compound. Poisson distribution. Joint distributions, conditional distributions, Distributions of functions of random variables. Convergence in distribution, in probability, with probability one and in mean square. Moments and cumulants. Mathematical expectation and conditional expectation. Characteristic function and moment and probability generating functions Inversion uniqueness and continuity theorems. Borel 0-1 law: Kolmogorov's 0-1 law. Tchebycheff's and Kolmogorov's inequalities. Laws of large numbers and central limit theorems for independent variables. Conditional expectation and Martingales.

(ii) Statistical Methods

(a) Collection, compilation and presentation of data, Charts, diagrams and histogram. Frequency distribution. Measures of location, dispersion, skewness and kurtosis. Bivariate and multivariate data. Association and contingency. Curve fitting and orthogonal polynomials. Bivariate normal distribution. regression-linear, polynomial. Distribution of the correlation coefficient, Partial and multiple correlation, Intraclass correlation, Correlation ratio.

(b) Standard errors and large sample test. Sampling distributions of x,s2, t, chi-squre and F; tests of significance based on them, Small sample tests.

(c) Non-parametric tests-Goodness of fit, sign, median, run, Wicloxon, Mann-Whitney, Wald-Wolfowitz and Kolmogorov-Smirnov. Rank order statistics-minimum, maximum, range and median. Concept of Asymptotic relative effciency.

iii) Numerical Analysis

Interpolation formulae (with remainder terms) due to Lagrange, Newton-Gregory, Newton Divided different, Gauss and Striling. Euler-Maclaurin's summation formula. Inverse interpolation. Numerical integration and differentiation. Difference equations of the first order. Linear difference equations with constant coefficients.

STATISTICS II

i) Linear Models

Theory of linear estimation. Gauss-Markoff setup. Least square estimators. Use of g-inverse. analysis of one-way and two way classified data-fixed, mixed and random effect models. Tests for regression coefficients.

ii) Estimation

Characteristics of good estimator. Estimation methods of maximum likelihood, minimum chi-square, moments and least squares. Optimal properties of maximum likelihood estimators. Minimum variance unbiased estimators. Minimum variance bound estimators. Cramer-Rao inequality. Bhattacharya bounds. Sufficient estimator. factorisation theorem. Complete statistics. Rao-Blackwell theorem. Confidence interval estimation. Optimum confidence bounds. Resampling, Bootstrap and Jacknife.

iii) Hypotheses testing and Statistical Quality Control

(a) Hypothesis testing: Simple and composite hypothesis. Two kinds of error. Critical region. Different types of critical regions and similar regions. Power function. Most powerful and uniformly most powerful tests. Neyman-Pearson fundamental lemma. Unbiased test. Randomised test. Likelihood ratio test. Wald's SPRT, OC and ASN functions. Elements of decision and game theory.

b) Statistical Quality Control: Control Charts for variable and attributes. Acceptance Sampling by attributes-Single, double, multiple and sequential Sampling plans; Concepts of AOQL and ATI; Acceptance Sampling by variables-use of Dodge-Romig and other tables.

iv) Multivariate Analysis

Multivariate normal distribution. Estimation of mean Vector and covariance matrix. Distribution of Hotelling's T2-statistic, Mahalanobis's D2-statistic, and their use in testing. Partial and multiple correlation coefficients in samples from a multivariate normal population. Wishart's distribution, its reproductive and other properties. Wilk's criterion. Discriminant function. Principal components. Canonical variates and correlations.

STATISTICS III

i) Sampling Techniques

Census versus sample survey. Pilot and large scale sample surveys. Role of NSS organisation. Simple random sampling with and without replacement. Stratified sampling and sample allocations. Cos and Variance functions. Ratio and Regression methods of estimation. Sampling with probability proportional to size. Cluster, double, multiphase, multistage and systematic sampling. Interpenetrating sub-sampling. Non-sampling errors.

ii) Design and Analysis of Experiments

Principles of design of experiments. Layout and analysis of completely randomised, randomised block and Latin square designs. Factorial experiments and confounding in 2n and 3n experiments. Split-plot and strip-plot designs. Construction and analysis of balanced and partially balanced incomplete block designs. Analysis of covariance. Analysis of non-orthogonal data. analysis of missing and mixed plot data.

iii) Economic Statistics

Components of time series. Methods of their determination-variate difference method. Yule-Slutsky effect. Correlogram. Autoregressive models of first and second order. Periodogram analysis. Index numbers of prices and quantities and their relative merits. Construction of index numbers of wholesale and consumer prices. Income distribution-Pareto and Engel curves. Concentration curve.

Methods of estimating national income. Inter-sectoral flows. Inter-industry table. Role of CSO.

iv) Econometrics

Theory and analysis of consumer demand-specification and estimation of demand functions. Demand elasticities. Structure and model. Estimation of parameters in single equation model-classical least squares, generalised least-square, heteroscedasticity, serial correlation, multi-collinearity, errors in variable model. Simultaneous equation models-Identification, rank and other conditions. Indirect least squares and two stage least squares. Short-term economic forecasting.

Statistics-IV

(i) Stochastic Processes

Specifications of a Stochastic Process, Markov chains, classification of states, limiting probabilities; stationary distribution; Random walk and Gambler's ruin problem. Poisson process, Birth and death process; applications to Queues-M/M/I and M/M/C models. Branching Process.

(ii) Operations Research

Elements of linear programming. Simplex procedure. Pirnciple of duality. Transport and assignment problems. Single and multi-period inventory control models. ABC analysis. General simulation problems. Replacemnet models for items that fail and or items that deteriorate.

(iii) Demography and Vital Statistics

The life table, its constitution and properties. Makehams and Gompertz curves. National life tables. UN model life tables. Abridged life tables. Stable and stationary populations. Different birth rates. Total fertility rate. Gross and net reproduction rates. Different mortality rates.

Standardised death rate. Internal and international migration: net migration. International and postcensal estimates. Projection method including logistic curve fitting. Decennial population census in India.

(iv) Computer Application and Data Processing

(a) Computer Application

Computer system concepts: Computer system components and functions. The Central Processing unit, Main memory, Bit, Byte, Word, Input/Output Devices, Speeds and memory Capacities in computer systems.

Software concepts: Overview of Operating Systems, Types and Functions of Operating System, application Software, Software for multi-tasking, multi-programming, Batch Processign Mode, Time sharing mode, Concept of System Support Programme, Overview of Existing Software packages on Word Processing and Spreadsheets.

Overview of an application Specific Programme: Flow charts, Basics of Algorithm, Fundamental of design and analysis of Algorithm; Basics of data structure, Queue, Stack.

(b) Data Processing

Data processing: Digital Number System, Number conversions, Binary representation of integers, Binary representation of real numbers, Logical Data element like cjharacter, fields, records, files, Fundamentals of data transmission and processing incluidng error contro and error processing.

Data base management: Data Resource management. Data base and file organisation and procesing. (a) Direct, (b) Sequantial, (c) Indexed Sequential file. Concepts of Client Server architecture, Data Base Administrator. An overview of DBMS software.

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