SECTION-II
STANDARD AND SYLLABI

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(s) of Economics/Statistics.

GENERAL   ENGLISH (COMMON TO BOTH IES/ISS)

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

GENERAL STUDIES (COMMON TO BOTH IES/ISS)

General knowledge including knowledge of current events and of such matters of everyday 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 a candidate should be able to answer without special study.

7. Marks will not be allotted for mere superficial knowledge.

8. Credit will be given for orderly effective and exact expression combined with due economy of words.

9. In the question papers, wherever required, SI Units will be used.

10. Candidates will be allowed the use of Scientific (Non-Programmable type) Calculators in Descriptive Type Papers at the examination. Programmable type calculators will, however, not be allowed and the use of such calculators shall tantamount to resorting to unfair means by the candidates. Loaning or interchanging of calculators in the Examination Hall is not permitted. However, no calculator will be allowed in the Objective Type Papers at the examination.

11. Candidates should use only International Form of Indian numerals (e.g., 1, 2, 3, 4, 5, 6 etc.) while answering question papers.

PART - II

Viva voce—The candidate will be interviewed by a Board of competent and unbiased observers who will have before them a record of his/her career. The object of the interview is to assess his/her suitability for the service for which he/she has competed. The interview is intended to supplement the written examination for testing the general and specialised knowledge and abilities for the candidate. The candidate will be expected to have taken an intelligent interest not only in his/her subjects of academic study but also in events which are happening around him/her both within and outside his/her own State or Country as well as in modern currents of thought and in new discoveries which should rouse the curiosity of well educated youth.

The technique of the interview is not that of a strict cross-examination, but of a natural, through directed and purposive conversation intended to reveal the candidate's mental qualities and his/her grasp of problems. The Board will pay special attention to assess the intellectual curiosity, critical powers of assimilation, balance of judgment and alertness of mind, the ability for social cohesion, integrity of character initiative and capacity for leadership.

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GENERAL ECONOMICS – I (For IES only)

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. Simple games of complete information, Concept of Nash equilibrium.

2. Theory of Production: Factors of production and production function. Forms of Production Functions: Cobb 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 aggression problem, Public goods and externalities, Divergence between social and private welfare, compensation principle. Pareto optimality. Social choice and other recent schools, including Coase and Sen.

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 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. Lorenz curve and Gini coefficient. Univariate and multivariate regression analysis. Problems and remedies of Hetroscedasticity, Autocorrelation and Multicollnearity.

GENERAL ECONOMICS – II (For IES only)

1. Economic Thought: Mercantilism Physiocrats, Classical, 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 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 approach. 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 of 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. IS-LM Model and AD-AS Model in Keynesian Theory.

4. Financial and Capital Market: Finance and economic development, financial markets, stock market, gilt market, banking and insurance. Equity markets, Role of primary and secondary markets and efficiency, Derivatives markets; Future 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 state and the market. Utilitarian and Welfarist 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 Poverty Index. Basics of Endogenous Growth Theory.

6. International Economics: Gains from International Trade, Terms of Trade, policy, international trade and economic development- Theories of International Trade; Ricardo, Haberler, Heckscher- Ohlin and Stopler- Samuelson- Theory of Tariffs- Regional Trade Arrangements. Asian Financial Crisis of 1997, Global Financial Crisis of 2008 and Euro Zone Crisis- Causes and Impact.

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. IS-LM Model and Mundell- Fleming Model of Balance of Payments.

8. Global Institutions: UN agencies dealing with economic aspects, role of Multilateral Development Bodies (MDBs), such as World Bank, IMF and WTO, Multinational Corporations. G-20.

GENERAL ECONOMICS – III (For IES only)

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, Rio process 1992 to 2012, 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, RIO Conventions. Climatic change problems. Kyoto protocol, UNFCC, Bali Action Plan, Agreements up to 2017, tradable permits and carbon taxes. Carbon Markets and Market Mechanisms. Climate Change Finance and Green Climate Fund.

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 behaviour 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 (For IES only)

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 stabilisation 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. 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.

4. 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.

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

6. 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.

7. Industry: **Strategy of industrial development**— Industrial Policy Reform; Reservation Policy relating to small scale industries. Competition policy, Sources of industrial finance. Bank, share market, insurance companies, pension funds, non-banking sources and foreign direct investment, role of foreign capital for direct investment and portfolio investment, Public sector reform, privatisation and disinvestment.

8. Labour—Employment, unemployment and underemployment, 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.

9. Foreign trade—Salient features of India's foreign trade, composition, direction and organisation of trade, recent changes in trade, balance of payments, tariff policy, exchange rate, India and WTO requirements. Bilateral Trade Agreements and their implications.

10. 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. Commodity Market in India-Spot and Futures Market, Role of FMC.

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

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STATISTICS-I (OBJECTIVE TYPE) (For ISS only)

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(i) Probability:

Classical and axiomatic definitions of Probability and consequences. Law of total probability, Conditional probability, Bayes' theorem and applications. Discrete and continuous random variables. Distribution functions and their properties.

Standard discrete and continuous probability distributions - Bernoulli, Uniform, Binomial, Poisson, Geometric, Rectangular, Exponential, Normal, Cauchy, Hyper geometric, Multinomial, Laplace, Negative binomial, Beta, Gamma, Lognormal. Random vectors, Joint and marginal distributions, conditional distributions, Distributions of functions of random variables. Modes of convergences of sequences of random variables - in distribution, in probability, with probability one and in mean square. Mathematical expectation and conditional expectation. Characteristic function, 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.

(ii) Statistical Methods:

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.

Standard errors and large sample test. Sampling distributions of sample mean, sample variance, t, chi-square and F; tests of significance based on them, Small sample tests.

Non-parametric tests-Goodness of fit, sign, median, run, Wilcoxon, Mann-Whitney, Wald-Wolfowitz and Kolmogorov-Smirnov. Order statistics-minimum, maximum, range and median. Concept of Asymptotic relative efficiency.

(iii) Numerical Analysis:

Finite differences of different orders: Δ, E and D operators, factorial representation of a polynomial, separation of symbols, sub-division of intervals, differences of zero.

Concept of interpolation and extrapolation: Newton Gregory's forward and backward interpolation formulae for equal intervals, divided differences and their properties, Newton's formula for divided difference, Lagrange's formula for unequal intervals, central difference formula due to Gauss, Sterling and Bessel, concept of error terms in interpolation formula.

Inverse interpolation: Different methods of inverse interpolation.

Numerical differentiation: Trapezoidal, Simpson's one-third and three-eight rule and Waddles rule.

Summation of Series: Whose general term (i) is the first difference of a function (ii) is in geometric progression.

Numerical solutions of differential equations: Euler's Method, Milne's Method, Picard's Method and Runge-Kutta Method.

(iv) Computer application and Data Processing:

Basics of Computer: Operations of a computer, Different units of a computer system like central processing unit, memory unit, arithmetic and logical unit, input unit, output unit etc., Hardware including different types of input, output and peripheral devices, Software, system and application software, number systems, Operating systems, packages and utilities, Low and High level languages, Compiler, Assembler, Memory – RAM, ROM, unit of computer memory (bits, bytes etc.), Network – LAN, WAN, internet, intranet, basics of computer security, virus, antivirus, firewall, spyware, malware etc.

Basics of Programming: Algorithm, Flowchart, Data, Information, Database, overview of different programming languages, frontend and backend of a project, variables, control structures, arrays and their usages, functions, modules, loops, conditional statements, exceptions, debugging and related concepts.

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STATISTICS- II (OBJECTIVE TYPE) (For ISS only)

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(i) Linear Models: