UPDATED SYLLABUS OF MAINS EXAMINATION OF J&K STATISTICS & STATISTICAL CUM EVALUATION SERVICE COMPETITIVE EXAMINATION

JAMMU & KASHMIR PUBLIC SERVICE COMMISSION JAMMU AND KASHMIR STATISTICAL CUM EVALUATION RULES (COMPETITIVE EXAMINATION) REGULATIONS, 1976 & APPENDICES THERETO. Government Order No.299 of 1976 'Dated 4-12-1976 In pursuance of the powers conferred by rule 6 of the Jammu and Kashmir Statistical cum evaluation Service Rules, l974, the Government in consultation with the Jammu and Kashmir Public Service Commission thereby make the following Regulations, namely: l. Short Tit1e: (1)The Regulations may be called the Jammu and Kashmir Statistical cum Service (Competitive Examination) Regulations, 1976. (2)These shall come into force at once. 2. Definitions (1) In these Regulations, unless the context otherwise requires, a) "available vacancies" means the vacancies in the service which as determined by the Government under the rules, 'are to be filled on the results of any examination. b) "Commission" means the Jammu and Kashmir Public Service Commission. c) "Examination" means a competitive examination for recruitment 'to the Service held under sub rule (1) of rule(6) of the Rules. d) "Lists" means the list of candidates prepared under sub rule(3)of rule 6 of the Rules. e) "Rules" means the Jammu and Kashmir Statistical cum Evaluation Service Ru1es 1974. (2) All other words and expressions used in these regulations and not defined shall have the same meaning as assigned to than in the Rules. 3. The examination shall be held at such intervals as the Govt. may, in consultation with the Commission, from time to time determine, but at least once in a calendar year unless cancelled for good and sufficient reasons. 4 (1) The examination will be conducted by the Commission in accordance with, the provisions of the Jammu and Kashmir Public Service Commission (Conduct of Examination) Rules 1973. (2) Applications for admission to the examination shall be accompanied by the attested copies of the following documents, which shall be produced in original at the time of viva voce test: (i) Academic Qualification (ii) Date of birth Certificate; (iii) Permanent Resident Certificate; (iv) Crossed bank draft or Indian Postal order for the amount as may be fixed by the Commission as Examination fee; and (v) Three copies of the latest passport size photograph (3) An application complete in all respects shall be submitted by the candidate desiring to appear in the examination direct to the Secretary of the Commission. In case of candidates already in Government service another copy of the application shall be submitted by them through proper channel but the copy addressed to the Secretary should be accompanied by the Crossed bank draft or Indian Postal order for the examination fee and the certificate mentioned in para (2) above. No admission provisional or absolute will be given unless the application routed by the Government employee through his Department is received duly supported by the Head of the Department concerned. Examination:- The Examination shall consist of two parts:- (i) Written Examination 600 marks (ii) Viva Voce 100 marks1. Written Examination:- (1)The written examination shall include compulsory and optional papers. Every candidate shall have to take all the compulsory papers, in addition to two optional papers. (2) Syllabus for the written examination, maximum marks and time allowed for each paper and standard of the Examination shall be as shown in Appendix I to these regulations. (3) Every candidate shall specify the option papers in his application form in which he wants to appear. The option once made shall be final. (4) Unless otherwise required by the examiner all question papers shall be answered in English. (5) Credit will be given for orderly, effective and exact expression combined with the economy of words in all papers of the examination. (6) If a candidate's handwriting is not easily legible deduction will be made on this account from the total marks otherwise, awarded to him. 7. Viva Voce Test:- (l) Candidates, who obtain such minimum qualifying marks in the written examination, as may be fixed by the Commission in their discretion, shall be called for' viva voce test. (2)The object of the Viva Voce test shall be to assess the candidate's intelligence, Perspicacity and aptitude. Questions regarding matters of general interest may also be asked. 8. Qualified candidates to be arranged in order of merit:- After the conclusion of the examination, the candidates will be arranged by the Commission in order of merit as disclosed by the aggregate marks finally awarded to each candidate, and in that order so many candidates as are found by the Commission in their discretion to be qualified by the examination, shall be recommended for appointment up to the number of unreserved, vacancies decided to be filled up on the results of the examination, provided, that any candidate belonging to a class

regarding which a provision for reservation of appointment or post has been made who though not qualified by the standard prescribed by the Commission is declared by them to be suitable for appointment thereto with due regard to the maintenance of efficiency and administration, shall be recommended for appointment to vacancies reserved for member of such class in that service. 9. Medical Fitness: candidate must be mentally fit and bodily sound and free from any physical defect likely to interfere with the discharge of his duties as an officer of the service. A candidate who after such medical examination as the Government may prescribe is found not 'to satisfy these requirements will not be appointed. Any candidate called for the viva voce by the Commission may be required to undergo medical examination. Note: Instructions to appear before Medical Board should not be deemed to mean that candidate for direct recruitment, if found fit, is necessarily given an appointment as the number of candidates who will be asked to appear for medical examination will generally be in excess of the total number of available vacancies. The medical examination will be conducted by a Medical Board in accordance with Appendix II to be arranged for by the Commission for which the candidate will have to pay to Medical Board a fee as may be prescribed from time to time for his/her medical examination. 10. Determination of order of merit in the case of tie2: The order merit shall be determined in accordance with the highest marks secured in the viva voce. Should the marks in the viva voce of the candidates also equal, the order of merit shall be decided in accordance with the highest marks obtained by such candidates in the aggregate of the compulsory papers. 11: Success in the examination confers no right to appointment unless Government are satisfied, after such enquiry as may be considered necessary, that the candidate is suitable in all respects for appointment to the service. By order of the Government of Jammu and Kashmir (Sd.) S.B. Mathur, Additional Secretary to Government, Planning & Development Department. APPENDIX-I A. Compulsory Subjects (i) General English 100 marks. (ii) General Knowledge (with emphasis On topics pertaining to Jammu & Kashmir)3 100 marks. (iii) General Economics 100 marks. (iv) Theory and Practice of Statistics 100 marks. B. Optional Subjects (i) Statistical Interfere (ii) Sample Surveys (iii) Economics (iv) Economics (v) Comparative Economic Development (vi) Pure Mathematics – I (vii) Pure Mathematics – II (viii) Pure Mathematics – III (ix) Applied Mathematics (x) Statistics – I (xi) Statistics – II (xii) Rural Economics & Cooperation (xiii) Principles of Office Management (xiv) Principles of Business Management (xv) Labour problems and Industrial Relations in India. (xvi) Higher Accounting Note: (i) The standard of the examination in compulsory subjects will be that of Degree of an Indian University and for the optional subjects that of a Master's Degree of an Indian University in the relevant discipline. The candidates will be expected to illustrate theory by facts and analyze problems with the help of theory. They will be expected to be particularly conversant with Indian problems in the field(s) of Statistics. (ii) Each paper will be of 3 hours duration carrying a total of 100 marks. (iii) The detailed syllabus for the written examination will be as under:- _____ 3 Added vide Govt. Order No.2-PD of 2009 dated 13.01.2009 SYLLABUS A - Compulsory Papers 1. General English 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. Passage will usually be set for summary of précis. 2. General Knowledge The paper will consist of two parts. In the first part candidates will be required to answer questions designed to test their knowledge of current events and of such matters of everyday observations 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. Questions may also be set on History of India and Geography of a nature which candidates should be able to answer without special study. In this part the emphasis shall be on the topics pertaining to Jammu & Kashmir4. In the second part candidates will be required to answer questions designed to test their ability to deal with facts and figures and to make logical deductions therefrom, their capacity to perceive implications, and their ability to distinguish between the important and the less important. 3. General Economics Scope and methodology Theory of consumers demand consumers surplus Theory of distribution Pricing of factors and production Laws of returns Pricing under various forms of marketing organisations. Theory of production Factors of production- Theory of rent, wages, interest and profit. Welfare Economics scope of welfare, economics Classical and neo-classical approach. ---------- ---------- 4 Added vide Govt. Order No.2-PD of 2009 dated 13.01.2009 Concept of economic growth and its measurement social Institutions and

economic growth characteristics and problems of a developing economy- Population growth and economic development. Planning concepts and methods Evolution of planning in India Five Years Plans objectives and techniques. 4. Theory and Practice of Statistics Part – A Statistical Methods:- (i) Primary and Secondary data, Methods of collecting primary data and preparation of questionnaires- Tabulation and compilation of data. (ii) Measures of Central Tendency and dispersion. (iii) Theory of probability – Definition, Law of large Numbers, Additive and multiplicative laws of probability and their applications, Independence of events. (iv) Elementary knowledge of theoretical distributions (Binomial, Poissons and Normal). (v) Correlation and regression- Concept and definition and simple applications. (vi) Theory of attributes- Basic concepts and their applications, Co-efficient and Association and Coefficient of contingency. (vii) Testing of hypothesis- Applications of t, x2 and f tests. (viii) Analysis of various concept, definition and importance. Simple applications with particular reference to Randomised Blocks and Latin squares. Part-II Applied Statistics (i) Elementary knowledge of sampling techniques- simple Random Sampling with and without replacement, stratified sampling, Ratio and Regression estimates, cluster sampling and systematic sampling. Sampling and non-sampling errors. (ii) Theory of Index Number: Tests of Index numbers. Wholesale and consumer price Index numbers. (iii) Analysis of time series components, Measurement of Trend and Seasonal variation. (iv) Interpolation. Graphic and Algebraic methods. (v) Demography- (a) Census, its features and functions. Methods of Census taking. (b) Vital Statistics- Measures of fertility, measures of Mortality- Life table, Abridge and comple. Standarised rates. (c) Population projections. Mathematical and component methods of projections of logistic curve fitting. OPTIONAL PAPERS Statistical Inference Note:- Candidates will be required to answer questions from Sections 'A' and 'B' of selections A and C. A. (i) Estimation. Different methods of estimation; method of maximum likelihood, method of minimum, chi-square, method of moments, method of least squares, asymptotic properties of maximum likelihood estimators, Cramer-Rao inequality and its generalisation to the multiparametic case. Bhattacharya bounds, sufficient statistics, Factorisation theroem, Pitman-Koopman-Darmois form of distributions, minimal set of sufficient statistics. Rao-Blackwell theorem. Complete family of probability distributions, complete statistics. Lehmann-Scheffe, theorem on minimum variance estimation. (ii) Testing of Hypotheses Neyman-Pearson theory of testing of hypotheses. Randomized and non-randomized tests. Most powerful and uniforamly most powerful tests Neyman-Pearson fundamental Lemma-Unbiasedness, consistency and efficiency of tests. Similar regions, tests with locally optimum properties. Type A, A1, B, C and D critical regions. Relationship between nations of completeness and similarity. Likelihood ratio principle of test construction and some of its applications Bartlets test for homogeneity of variances. (iii) Non-para metric tests Orders statistics, small sample and large sample distribution theory, distribution free confidence intervals for qualities. Distribution-free test for (i) Goodness of fit, chi-square test, kol-mogorov Simrnov test. (ii) Comparison of two populations, Run test, Dixon's test, Wilcoxon's test, Median test, Sign test, Fisher Pitman test. (iii) Independence, Contingency, Chi-square, Spearman's and Kendall's rank correlation coefficients. Large sample properties of non-parametric text. U-Statistics and their limiting distributions. B. Decision Functions Statistical game and principles of choice associated with it. Formulation of statistical problems as a statistical game, decision unctions, randomised and non-randomised decision rules. Minimax Bayes and minimum regret decision rules. Admissible and Minimax tests. Admissible and minimax estimates under square error loss function. Minimal complete class of tests. Principle of sufficiency and principle of invariance. Huntstein theorem. Minimax invarient decision rules. C. Multivariate Analysis Multivariate Normal Distributions Estimation of Mean Vector and covariance matrix, Distribution of sample mean vector and interference relating to mean vector with unknown matrix; Hotelling's Tests based on T2, power functions of T2 and F; Optimum properties of T2. Partial and multiple regression co-efficeints in normal correlation, Behren's Fisher problem; Wishart distribution, Reproductive property of Wishart, Generalized analysis variance, Mahalanobis's D2 Discriminant function; Principal Component analysis; Canonical variates and canonical correlation; equality of several convariance matrices. Sample Surveys Place of sampling in census and survey work. Concept of frame and sampling unit. Sampling techniques random sampling stratified sampling choice of strara, multistage sampling cluster sampling, systematic sampling, double sampling, variable sampling, fraction sampling with the provability of proportional to size multiphase sampling inverse and sampling. Estimation procedures; Estimates of population total and mean of bias

in estimates; standard error of estimates; Ratio regression and product estimates. Optimum designs; cost and variance functions. Use of pilot surveys, Optimum size and structure of sampling units. Optimum allocation in stratified Multiphase and multistage designs. Optimum replacement fraction in repetitive surveys. Non-sampling errors and their control, theory of non-response, inter penetrating sample. Design and organisation of pilot and large scale sample surveys. Operational procedures for drawing samples, use of random sampling numbers, various methods of drawing P P S samples. Procedures for collection and tabulation of data. Analysis of survey data and preparation of reports. Economics-I Scope and methodology. Equilibrium analysis. Theory of Consumer's demand. Indifference curve analysis revealed preference approach consumer's surplus. Theory of production. Factors of production. Production functions. Laws of returns, Equilibrium of the firm and the industry. Pricing under various forms of market organisation. Pricing in a socialist economy. Pricing in a mixed economy. Public utilities: economic characteristics of public utilities, price determination in public utilities, regulation of public utilities. Theory of distribution. Pricing of Factors of production. Production theories of rent, wages, interest and profit. Macro-distribution theory. Share of wages in national income. Profits and economic progress, Inequalities in income distribution. Theory of employment and output the classical and neoclassical approaches-Keynesian theory of employment- Post Kenynesian development. (Economic fluctuations Theory of business cycle) Fiscal and monetary policies for control of business cycles. Welfare economics: Scope of Welfare economics: Classical and neo-classical approaches, New Welfare economics and the compensation principles, optimum conditions, policy implications. Economics-II Concept of economic growth and its measurement. Social accounts, natural income accounts flow of funds on economic growth-characteristics accounts input output accounting. Social Institutions and economic growth, Characteristic and problems of developing economies. Population growth and economic development. Planning concept and methods, Planning under capitalist and Socialist forms of economic organisation. Planning in a mixed economy. Perspective Planning. Regional Planning. Investment criteria and choice of techniques. Cost benefit analysis. Planning models. Planning in India. Evolution of planning. Five year Plans Objectives and technique, Problems of resources mobilization, administration and public co-operation. Role of monetary and fiscal policies, price policy. Controls and market mechanism. Trade policy and Balance of payments. Role of public enterprises. Comparative economic development A comparative and historical study of modern economic development under different social systems with special reference to India, Japan, France, U.K, USA and USSR. The candidates will be expected to make a critical appraisal of the historical evolution and operational features of the various types of economic e.g. market oriented free enterprise economy, centrally planned economy and their variations, particularly from the point of view of the lessons that they have for the developing economies. Pure Mathematics-I Functions of a real variable; construction of system of real numbers from rational numbers by Dedekinds methods. Bounds and limits of sequences and functions. Convergence point-wise and uniform of sequences, infinite series and infinite products. Metric spaces: Open and closed sets, continuous functions and homorphism, convergence and completeness, theorem on nested closed sets in complete metric spaces. Compactness for metric spaces and euclideant spaces. Uniform continuity and Arzela's theorem. Connected sets in metric spaces. Differentiability of functions, of one and several real variables. Mean value theorems. Tylor expansion of functions of one and more variables. Extreme value of functions including methods of labrange multipliers. Implict and inverse function theorems. Functional dependence and Jacobian. Riemann integration mean value theorems of integral calculus. Improper integrals. Convergence of integral. Differentiation and integration under the integral sign. Live and surface integrals. Multiple integral, Green's and Stokes theorems. Measures Theory, Lebesgue measure, measurable sets and their properties, measurable functions, Lebesgue integral of bounded functions over sets of finite measures. The integral of a non-negative function. The general Lebesgue integral Convergence in measure. Fatou's lemma. Monotone, dominated and bounded convergence theorem vital covering theorem. Functions of bounded variation. Absolutely continuous functions. Fundamental theorem of integral calculus, stielties integral. Functions of a complex variable, Analytic functions, Cauchy Riemann equations. Integration of complex functions Cauchy's fundamental theorem and integral formulae, Morera's theorem. Taylor and Laurent expansions. Zeros and Poles, Singularities. The residue theorem and its applications Argument, Principle, Rouches theorem. Maximum modulus principles and

Schwarz lemma. Bilinear transformations, Conformal representation. Pure Mathematics-II Modern Algebra including Matrices an determinants-semi-group and groups; Isomorphism; Transformation group Cayley's theorem. Cyclic groups. Permutations, even and odd permutations. Coset decomposition of groups Lagranges theorem. Invariant sub-groups and factor groups. Normal series composition series and Jordan-Holder theorem. Rings: Integral domain Division rings. Fields, Matrix rings, Quatermions, Sub-rings Ideals maximals, Prime and Principle ideals, Unique factorization domains. Difference rings, Ideals and difference rings of integrals. Format's theorem Homomorphism of rings. Field extensions algebraic and transcendental f field extensions. Elements of Galois theory and its applications to solution of equations by radicals. Vector space over a field. Sub spaces and their algebra linear independence basis dimension. Factor spaces. Isomorphism of vector spaces. System of linear equations. Rank of a matrix. Equivalence relations on matrics elementary metrices how equivalence similarity. Linear transformations on vector spaces, their rank and multility. Dual spaces and dual basis. Linear, bilinear and quadratic forms. Rank and signature. Reduction of a quadratic form to canonical form and simultaneous reduction of two quadratic forms. Determinant functions. Its existence and uniqueness. Laplace's method of expanding a determinant. Product of two determinals. Binet Cauchy formula, characteristics and minimal Polynomials, eigen values and eigen vectors. Cayley Hamilton theorem. Diagonalization theorems. N dimensional geometry Elements of the geometry of n-dimension, Desargues theorem. Degrees of freedom of linear spaces. Daulity, Parallel lines. Elliptic hyperbolic , Euclidean and projective geometries. Line normal to (n-1) Flat. System of n/mutually orthogonal lines. Distances and angles between flat spaces. Convex sets and convex cones. Convex hull. Theorems on separating hyperplanes. Theorem that a closed convex set which is bounded from below has extreme points in very supporting hypen plane. Convex hull of extreme points. Convex polyhedral cones. Linear transformations of regions. Differential geometry curves in space. Envelopes Developable surfaces. Developable associated with a curve. Curvilinear co-ordinates on a surface. First and second fundamental forms curvature of normal section. Lines of curvature. Conjugate system Asymptotic lines. The equations of gauss and of codazzi. Geodesics and Geodsic parallels. Rules surfaces. Pure Mathematics-III Numerical Analysis and Difference Equations, Finite differences, Interpolation. Extrapolation Inverse interpolation. Numerical differentiation and numerical integration. Solution of the linear difference equation. Linear difference equations with constant co-efficients. Solution of ordinary differential equations. Methods of starting the solution and continuing the solution. Simultaneous linear equation and their solution. Roofs of polynomial equations. Solution of simple problems by relaxation method Nomograms. Differential Equations Existence theorem for the solution of $dy/dx = f(x,y)$. First order linear and non-linear equations. Linear equations with constant co-efficients, Homogeneous linear equations. Second order linear equations. Frobenius method of integration in series. Solutions of legendre. Bessel and Hermite equations. Elementary properties of Legendre and Hermite polynomials and Bessel functions. System of simultaneous linear equations. Total differential equations with three variables. Partial differential equations. Partial differential equations of first and second order Lagrange's Charpit's and Mongre's method. Linear partial differential equations with constant co-efficients. Solutions of Laplace wave and diffusion equations by separation of variables. Calculus of variations: Necessary conditions for a minimum. Derivation of the Euler Equations. Hamilton's principle. Hamiltonian. Isoperimetric problems. Variable and point problems. Minima of functions of integrals. Bolza's problems. Multiple integral problems. Direct methods in calculus of variation. Second variation and Legendre's necessary condition for a minimum. Harmonic Analysis: The representation of function by Fourier series, Dirichlet integral Reimann Lebesgue Theorem. Reimann's localization theorem, sufficient conditions for the convergences of Fourier series (Jorden, Dini and dela Valee poussin) Fourier integrals, Sampling theorem power spectrum Auto correlation and cross correlation. Applied Mathematics Statistics: Vector treatment of equilibrium of a rigid body under forces not necessary coplanar. Central axis. Principles of virtual work. Stability, strings under central forces equilibrium of strings on rough and smooth plane curves Elastic strings. Attractions and potentials of a rod, Disc and sphere. Dynamics: Newton's law of motion. 'D' Alembert's principle. Rectiliner motion. Motion in two dimensions. Motion in a resiting medium. Planetary motion. Impulsive forces and impacts. Principle of momentum and energy. Degrees of freedom and constraints. Generalized co-ordinates Labrange's equations for holonomic system. Euler's dynamical and geometrical equations.

Hamilton's Principle. Hamiltons equations. Introduction of manbody problem. Hydrodynamics: Eulerian and Lagrangian equations of motion stream lines. Vorticity and circulation and their constancy in ideal fluid. Bernoulli's theorem and its application. Potential flow around cylinders and spheres. Blasius theorem and its application. Techniques of images and coformal transformation for solution of hydrodynamical problems. Simple properties of vortex motion, uniqueness theorem. Viscousfluid Napier strokes equations. Flow between parallel walls and straight pipes. Oseen and strokes approximation. Slow motion past a sphere. Electricity and magnetism Coulomb Law. Charges conductors and condensers. Deilectrics. Steady currebts Magnetic effects of currents. Induced currents and fields. Maxwell equations. Electromagnetic conditions at an interface between two media. Electromagnetic conditions at an interface between two media. Electromagnetic potentials, stress and energy. Poynting's theorem, Joule heat. Alternating currents, Electromagnetic waves in isotropic dielectric. Reflections and refraction of electromagnetic waves. Waves in conducting media. Thermodynamics: Concepts of quantity of heat, temperature and entropy. First and second laws of thermodynamics. Specific heats, change of phase vapour pressure. Conduction of heat. Radiation, Planck's law. Stefan's law. Thermodynamic function and potentials. Heterogenous system and Gibb's phase rule. Statistical Mechanics: Geometry and Kinematics of the phase space. Maxwell Bottzmann Bose Einstein and Fermi Dirac Statistics. Statistics-I Different types of numerical approximations, finite differences standard interpolation formulae and their accuracies; inverse interpolation, Numerical methods of differentiation and integration. Definition of probability, Classical approach, axiomatic approach, sample space, Laws of total and compound probability. Conditional probability. Independent events. Bay's formula. Random Variable; probability distribution, Mathematical exception. Moment generating functions and characteristic functions. Inversion theorem. Tchebychevis inequality. Conditional distribution. Laws of large numbers and central limit theorems. Standard distributions, Binomial, Poisson, Normal rectangular Exponential, Negative binomial, Hypergeometic, Cauchy, Laplace, Beta and Gamma distributions. Bivariate and Multivariate normal distributions. Large and small sample theory, Asymptotic sampling distribution and large sample tests Standard sampling distributions such as t, x2 F and tests of significance based on them. Association and analysis of contingency tables. Correlation co-efficient and its distribution; Fishers 'Z' transformation. Regression. Linesr and Polynomial multiple regression-partial and multiple correlation co-efficient including their distributions in null cases intra class correlation. Curve fitting and orthogonal polynomials. Analysis of variance. Theory of linear estimation. Two way classification with interaction. Analysis of covariance. Basic principles of design of experiments. Layout and analysis of common designs such as randomized blocks. Latin square. Factorial experiments and confounding. Missing plot techniques. Sampling techniques: Simple random sampling with and without replacement. Stratified sampling. Ratio and regression estimates. Cluster sampling. Multistage sampling and systematic sampling. Non-sampling errors. Estimation: Basic concepts. Characteristic of a good estimate. Point and interval estimates. Maximum likelihood estimates and their properties. Tests of hypotheses. Statistical hypotheses. Simple and Composite. Concept of a statistical tests. Two kinds of error power function. Likelihood ratio tests. Confidence interval estimation. Optimum confidence bounds. Common non-parametric test such as sign test medium test and run test. Wald's sequential probability ratio test for testing a simple hypothesis against a simple alternative OC and ASN functions and their approximations. Statistics-II Note:- In this subject, there will be one question paper on the following four branches viz. (i) Industrial Statistics (including statistical quality control); (ii) Economic Statistics; (iii) Educational Statistics (including Psychometry) and (iv) Demography and Vital Statistics. Candidates offering this subject will be required to answer the questions at least on two branches. (i) Industrial Statistics (including Statistical Quality Control). Theoretical basis of quality control in industry, Tolerance limits. Different kinds of control charts- X, R charts, P and C charts, group control charts. Acceptance sampling. Single, double, multiple and sequential sampling plans OC and ASN functions. Sampling by attributes and by variables. Use of Dodge-Roming and other tables. Designs of industrial experimentations. Use of regression techniques and analysis of variance techniques in industry. Applications of operational research techniques including linear programming in industry. (ii) Economic Statistics. Index numbers of prices and quantities. Different types of index numbers i.e. index numbers of wholesales prices and cost of living index numbers. Theory of index numbers. Income distributions. Pareto and other curves Concentration

curves and their uses. National Income: Different sectors of national income. Methods of estimating national income. Inter-sectoral flows. Problems of regional income estimates. Inter-industry table. Applications of input-output analysis and linear programming. Analysis and interpretation of economic. Time series. The four component of an economic Time series, multiplicative and additive models. Trends determination by curve fitting and by moving average methods. Determination of constant and moving seasonal indices. Auto-correlation, periodogram analysis. Tests of randomness. Theory of consumption and demand, demand functions. Elasticities of demand, statistical analysis of demand with the help of time series and family budget data. (iii) Educational Statistics (including psychometry). Scaling of test items, scores, standard scores, normal scores. T and C scales, Stanine scale, percentile scale. Mental tests. Reliability and validity of tests. Different methods for computing reliability. Index of reliability procedures for determining validity. Validation of a test battery. Speed versus power tests. Factory Analysis, Item analysis. Use of correlation methods in aptitude tests. Measurement of learning and forgetting. Learning models. Attitude and opinion measurement. Measurements of group behaviour. (iv) Demography and vital Statistics. The life table, its construction and properties. Makeham's and Compert curves. Derivation of annual and central rates of mortality. National life tables. U.N. Model life tables. A bridged life tables. Stable population. Stationary population. Crude fertility rates, specific fertility rates, gross and net reproduction fates, family size; crude mortality rate, infant mortality rates, Mortality by cause of death; Standardized rates. Internal and international migration; net migration; backward and forward survivorship ratio methods. Demographic transition; social and economic determinants of populations. Population projections. Mathematical and Component methods- Logistic curve fitting. Rural economics and Co-operation Role of agriculture in economic development. Agricultural production and resource use production functions, returns to scale, cost and supply curves; factor combination and selection of techniques under uncertainity. Crop Planning. Factor Markets. Land market, land value and rent. Labour market, wages and employment, unemployment and under employment, Capital market, savings and capital formations. Commodity demands; demand for food. International trade in agricultural commodities- prices tariffs, commodity agreements, International programmes for agricultural development. Problems of Indian rural economy. Agricultural holdings. Land utilisation, Cropping pattern. Problems of agricultural inputs, land tenure reforms. Community Development and Panchayati Raj. Agricultural labour. Subsidiary occupations and rural industries. Rural indebitedness. Agricultural credit. Agricultural marketing and price spread. Commodity demands and demand for food. Price support and stabilization, Taxation of agricultural land and income. Growth rate in Indian agriculture under Planning. Agriculture in Five Year Plans. Major programmes of agricultural development. Co-operation: Principles, origin and development. Comparative study of co-operation in India and abroad. Structure Organisation and working of various types of co-operative instructions in India. Role of these institutions in the rural economy. The State and the co-operative movement. Role of Reserve Bank of India. Principles of Office Management 1. Office work in Modern enterprises. 2. Role of Office Management. 3. Scientific Office Management. 4. Office Services. (i) Reports (ii) Correspondence (iii) Calculating and checking. (iv) Filling. (v) Records retention. (vi) Duplicating. (vii) Handling the mail. (viii) Communication. 5. Planning Office work and environments. (i) Office location and layout. (ii) Equipment and Machines. (iii) Working conditions. (iv) Office work and procedures. 6. Organisation. (i) Principles of Office Organisation. (ii) Organisational relationship. 7. Motivating office personnel. 8. Office Supervision. Principles of Business Management (i) Industrial Revolution and the growth of manufacturing processes; Economic and social effects of Industrilisation. (ii) Nature, scope and significance of Management and Administration. The modern concept of management. (iii) The process of Management-Planning Organisation, Co-ordination, Command and Control, Levels of authority and responsibility. Centralisation and decentralisation communication and delegation. (iv) Process of Control: Production Planning and Control quality control, Inventory control, Budgetory control and cost control. (v) Output efficiency: Plan location and Plan layout, Material handling, simplification of processes, standardisation. (vi) Office Administration: Location and layout of office. Organisation of the office and Principle of the office Organisation. Labour Problems and Industrial relations in India Labour problems in India. The working class in India sources of supply. Methods of recruitment, Employment exchanges. Survey of labour conditions in Indian Industries working conditions wages, absenteeism, Labour turnover, leaves and holidays, Disciplinary actions. Women and

child labour. Social Security, Industrial housing and labour efficiency. Labour Legislation in India: Development and trend of Law, dealing with factories, wages, social security and workmen's compensation. Trade Unions in India: History and development, present structure policies, methods and legal status. Collective Bargaining and Government regulations of labour relations. Industrial relations. Causes of unrest machinery for the settlement of Industrial disputes in India-conciliation and Arbitration adjudication and other methods of adjustment workers participation in Management in India. Roll of LL.O. in the field of labour. Higher Accounting 1. Construction, Interpretation and Criticism of published Accounts. 2. Preparation of Annual Accounts of Banking Companies and Insurance Companies. 3. Preparation of consolidated balance sheet and profit and loss accounts. Statements under section 212-214 of Indian Companies Act. 4. Special problem in Reconstruction and Amalgamation of Companies. 5. Valuation of shares. 6. Valuation of goodwill. 7. Prepareciation and changing price levels. 8. Profits-concepts of profits in Accountancy; nature and measurements- Profit according to Indian Companies Act, their determination and disposal. 9. Budget and Budgetory control: Use of preparation of scales budget, purchase budget, production budget, income budget, Budgets as a means of controlling costs and increasing profits.