

**Subject Code: 213**

**TAMIL NADU PUBLIC SERVICE COMMISSION**  
**POST OF RESEARCH ASSISTANT IN EVALUATION AND**  
**APPLIED RESEARCH DEPARTMENT**  
**(POST GRADUATE DEGREE STANDARD COVERING ALL THE SUBJECTS**  
**REFERRED IN THE RULES)**

**Unit - I:**

Indian Economy – Growth and development: Agriculture: Area, Yield, Production, marketing and sales. Rural Development – Industry: Input and output – Service Sector : Types of service sector, skilled labour, semi skilled labour and unskilled labour – Changing Sectoral contributions – Industrial Policy Changes – FDI – Infrastructure: Public Health – Education – drinking water – sanitation – Public transport – Banking and financial services – housing facilities – Nutrition – Investment – Public Private Participation – Inclusive growth. Human Development: Concepts, Trends and Issues – Employment, unemployment, under employment and disguised unemployment – concepts, measurement and Trends – Employment in Organized and unorganized sector – Strategies for Employment Generation. Poverty: Concepts, measurement and Trends, Fiscal Policy – FRBM Act – Goods and Service Tax (VAT) – Fiscal Federalism – Parallel economy in India – Inflation: Definition, trends, estimates, consequences and remedies – RBI – Monetary and Fiscal policy – Banking Sector Reforms – India's foreign trade, composition, direction and recent changes in trade policy – Balance of payments – India and WTO requirements – Global Financial Crisis and its Impact on India. Index number: Consumer price index – Wholesale price Index. Time series analyses – Moving average Method

**Unit - II:**

Primary data collection – Field Investigation – Census method – Sampling Method – Direct personal observation – Interview method – Indirect oral interview – Information through agencies – Mailed Questionnaires and scheduled sent through enumerator. Secondary data collection – Books – Journals – Government (Ministry) Records and reports from government agencies – Bibliography – Autography – Web site – News Paper – Periodicals, etc Evaluation and preparation of the report and components of evaluation Report: Executive summary – background and purpose – statement of the problem – objectives and Hypotheses – evaluation methods (Statistical methods used in the study) – result and discussion of the result – conclusion and recommendation – reference or bibliography – appendices.

**Unit – III:**

Econometrics - definition, methodology, Data – meaning and types of data such as cross-section, time-series and panel data, primary & secondary data – advantages & disadvantages, Variables – meaning and types such as quantitative and qualitative variables, measurement scales of variables such as ratio, interval, ordinal and nominal-

simple examples. Correlation – simple and multiple correlation, properties of correlation coefficients, Karl Pearson's and Spearman's rank correlation coefficients, Simple numerical problems - Simple & multiple linear regression model – introduction, assumptions, least squares principle, least squares estimators, properties of regression coefficients(Gauss-Markov theorem), interpretation of regression output -  $R^2$  & adjusted  $R^2$ , regression coefficients with t-values and level of significance, Simple numerical problems - advantages of regression analysis over correlation analysis, Functional forms of regression models – log-linear, log- lin and lin-log models and computation of elasticity, computation of simple and compound growth rates - simple numerical examples.

#### **Unit - IV:**

Econometric Problems: heteroscedasticity, multicollinearity and autocorrelation – definition and consequences. Dummy variables: definition, generation of dummy variables, problem of dummy variable trap, cautions in using dummy variables, inclusion and interpretation of dummy variables in the regression. Qualitative response regression models – linear probability, logit and probit models – an introduction. Basics of time-series: additive and multiplicative models, determination of trend by free drawing, moving average methods, and seasonal indices, definition of stationarity, tests for stationarity and transformation of non-stationary series into stationary series.

#### **Unit - V :**

Compilation and Tabulation of data Collected - Classification – Types of Classification – Formulation of discrete and continuous frequency distribution ( uni-variate and Bi-variate ). Pictorial Representation of data: Bar diagrams – Pie diagrams – Histogram – Ogives and Lawrence Curve Measures of Location – Mean , Median, Mode, Harmonic Mean and Geometric Mean – Quartiles - Measures of variation : Range, Quartile deviation , Mean deviation, Variance and Standard deviation. Coefficient of variation , skewness and Kurtosis.( All the calculation of measures are for both grouped and ungrouped data ) Probability and Distribution: Introduction to probability: Random Experiments, Sample Space and events, Definition of probability. Classical, Empirical and Axiomatic approach to probability; Addition and Multiplication Theorem, Conditional probability and Baye's Theorem. Random Variables and Distribution function – Mathematical Expectation and conditional Expectation. Convergence in Probability – Weak Law of large Numbers and strong law of large Number – Central limit Theorem – Discrete distributions: Binomial, Poisson. Continuous Distributions: Normal Distribution Chi-Square, t and F distributions and their properties.

#### **Unit - VI:**

Application of Statistical Methods - Sampling Theory: Introduction to the theory of Sampling: Sampling designs – Simple Random Sampling with and without replacement - Systematic, Stratified, Ratio and Regression Sampling methods , Sampling and non – sampling errors – Cluster sampling, Purposive Sampling Quota Sampling. Testing of Hypothesis: Introduction to Testing of Hypothesis: Simple, Null and Alternative hypotheses, composite hypothesis, two kinds of Errors – Critical Region – Power

function. Testing of significance using chi-square, t and F tests.(simple problems) ANOVA- One way and Two way classifications. Application of Statistical Methods through MS-Excel – Language : Over view of MS-Excel: Construction of charts and diagrams – Sorting – Filtering – Removing duplicates – Calculation of Measures of Central tendency, Measures of dispersion, correlation Regression and curve fitting using – Excel.

### **UNIT - VII:**

Theory of Consumer Behavior - Utility and its measurement - Indifference curve analysis and Consumer's surplus. Demand and supply functions - Elasticity of demand and supply - Factors affecting demand and supply. National Income - Concepts and measurement. Classical and modern theories of Employment. Consumption function - Investment and savings. Concept of Multiplier and Accelerator. Inflation - Nature, Effects and controlling mechanisms. Monetary policy and Fiscal policies and Role of RBI. Types of Market Structure - perfect competition, monopoly, monopolistic competition, oligopoly and price determination. Agricultural marketing - Characteristics of Agricultural products and constraints in marketing agricultural produce. Marketable and Marketed surplus estimation. Estimation of price spread and Marketing Efficiency. Market integration, Marketing Intelligence and Marketing Acts. Institutions in Agricultural Marketing - Regulated Markets, Cooperatives, Commodity Boards, Contract Farming, Commodity Exchanges, Farmers' Markets and Farmers Producers Organizations. Commission on Agricultural Costs and Prices - Agricultural Price fixation and price support programs and policies. Price forecasting. Supply chain Management and logistics. Development planning in India - Agriculture in five year plans. Land tenure and reforms. Unemployment, Poverty and inequality. Food and nutritional security. Population policies. Income distribution - Social Choice Theory - Public goods - Welfare economics. Rural Indebtedness. Financial Institutions and Credit Flow to Rural/ Priority Sector. Agricultural Lending - Direct and Indirect Financing - Financing through Co- operatives, Commercial Banks and RRBs - Role of Lead Bank and NABARD - District Credit Plan. Credit linked Rural Development Programs - RIDF. Micro- Financing - Role of MFI's, NGO's, and SHG's. Credit Inclusion–Credit Widening - Credit Deepening. Risk in agriculture and different Crop Insurance Programs - Agricultural project preparation - project cycle - Costs and benefit analysis – Discounted and Undiscounted Measures – Sensitivity analysis. Technical feasibility of economic viability of projects. Use of Network techniques – Project monitoring and evaluation. Forms of production functions – Returns to scale vs Economies of scale. Cost of cultivation vs Cost of Production – Cost concepts – Fixed Cost, Variable cost, Average Cost and Marginal cost. Efficiency Measures – Technical and Economic Efficiency. Financial statements and ratio analysis. Partial and complete budgeting and their applications.

### **UNIT - VIII:**

Concepts, Classification and Problems of Natural Resource Economics. Economy and Environment interaction. Resource scarcity – Limits to Growth – Measuring and mitigating natural resource scarcity–scarcity indices. Malthusian and Ricardian Scarcity.

Theory of optimal extraction of exhaustible and renewable resources. Property rights – Issues in natural resource management – private property, common property and open access resources – Collective action in common property resource management. Land use planning – optimal management of land, water, forests and fisheries. Resource mapping – GIS and remote sensing applications. Environmental problems and quality of environment – Economics of the environment – Theory of externality. Sources and types of pollution – air, water, solid waste, land degradation – Environmental and economic impacts. Economics of pollution control – efficient reduction in environmental pollution. Environmental regulation – Economics instruments and indirect instruments (command and control policies). Environmental legislations in India. Concept of sustainable development – Indicators of sustainability. Environmental Accounting – resource accounting methods. Climate change and its impacts – mitigation efforts and international treaties. International Trade and Comparative Advantage. Terms of Trade and Instruments of Trade Policy – Tariffs and Non tariffs. Balance of Trade vs Balance of payments. Exchange Rates. International Organizations – IMF, IBRD, IDA, IFC. WTO. Fundamental vs. Applied Research – Qualitative vs Quantitative Research. Research Prioritization – Identification of Research Problems and Prioritization. Research Process. Trade-off between scope and cost of the study. Research Design and Techniques. Hypothesis – Meaning – Characteristics – Types of Hypothesis and Testing. Setting of Objectives and Hypothesis. Sampling Theory and Sampling Design. Sampling Error. Sampling methods – Probability and Non-Probability methods. Interviewing Techniques – Questionnaire vs Interview schedules and Field Problems – Methods of Conducting Survey. Types of data – Primary and Secondary data. Sources of Secondary Data and Data collection techniques. Types of questions in interview schedule – Structured, Unstructured, Open Ended and Closed-Ended Questions. Data coding and data entry. Data Tabulation and Validation of Data. Data Processing. Application of Analytical tools to data – Simple and Multiple regression and problems in estimation – Multicollinearity, Heteroscedasticity and Autocorrelation. Optimization Models – Linear Programming: Concepts and theories. Problem formulation – Minimization and Maximization problem (Primal and Dual solutions). Sensitivity analysis. LP in farm planning and regional planning. Risk Programming and dynamic programming techniques.

### **Unit - IX:**

Nature and Scope of Sociology, Sociology as a Science. Individual and Society. Social Process: Competition, conflict, Co- operation, Accommodation, Assimilation, Social control. Social Institutions: Family and Marriage. Theoretical Perspectives:- Structural Functional Perspective: August Comte, Herbert Spencer, Max Weber, Emile Durkheim, R.K. Merton. Conflict Perspective: Karl Marx, Ralf Dahrendorf and L. A. Coser. Caste System in India: Origin of the caste system; cultural and structural views about caste; mobility in caste; change and persistence of caste in modern India; views of Gandhi and Ambedkar about caste system. Class Structure in India: Agrarian and industrial class structure; emergence of middle class. Rural Social Structure: Village Social Structure and Importance of Village Studies. Peasant society and agrarian systems; land tenure systems, social consequences of land reforms and green revolution. Agrarian unrest and movements in India. Rural social problems in India: poverty, unemployment,

indebtedness, farmer's suicide and bonded labour. Strategies of rural development programmes. Tribal Societies in India: Type and distinctive features of tribal communities in India and their geographical spread. Problems of tribal communities: land alienation, poverty, indebtedness, health and nutrition, education, Integration and issues of tribal identity. Tribal development policies after independence.

### **Unit - X:**

Socio- religious reform movements: Bhakthi Movements, Arya Samaj, and Ram Krishna Mission. Backward Class Movements: Satya Sadhak Samaj, Sri Narayanguru Dharma Paripalana Movement (SNDP), Self-respect movement, Dalit Movements, Political Mobilization of Backward Classes. Women in Indian society: Socio-cultural interpretation of women in India. Demographic profile of women. Problems of Women in India: dowry, domestic violence, discrimination, female infanticide, honor killing, sexual harassment. Women empowerment programmes and SHGs. Social Research: Meaning of Social Research, Scope and Importance of Social Research. Types of Research, Research Process: Identification and formulation of research problem. Methods of Research: Descriptive and Explorative methods. Sampling Methods, Methods of Data Collection. Tools of Data Analysis: Univariate and Bivariate Statistics, Chi-square Test. Application of ICT in Social Research. Evaluation Research: Meaning and aims of evaluation research. Types of evaluation and their purpose. Levels of measurement: population-based vs. program-based. Sources of data. Study designs. Impact Assessment Research: Programmes and policy evaluation research. Environmental impact assessment research. Research Report Writing: Organization of a research report: Title, Abstract, Introduction, Experimental Details or Theoretical Analysis, Results, Discussion, Conclusions and Summary, References. Quality of good research report. Significance of research report.

### **Unit – XI:**

Public Administration Theory and Principles - Public Administration: Meaning and scope and significance – Public vs Private Administration – Approaches to the study of Public Administration-Comparative Public Administration – Development Administration - New Public Administration – New Public Management - Principles of Organization and Administration – Classical theories – Human Relation theories – Modern theories of administration – Bureaucratic culture-Administrative Responsibility and Ethics.

### **Unit – XII:**

Public Administration in Practice - Public Financial Administration: Budgetary process and accountability, Union – State financial relations in India – Good Governance: Social welfare schemes in Tamil Nadu, Women Empowerment schemes in Tamil Nadu, Health care Policy in Tamil Nadu – E. Governance : ICT application in government – IT parks in Tamil Nadu – District administration: e-governance in Districts, THAI scheme, Pudhuvazhvu scheme – Special Economic Zones – Panchayat Raj: Rural Development programmes in Tamil Nadu, Environmental protection in Tamil Nadu – Administrative reforms: Personnel and Administrative Reforms, Urban Governance: Urban Local bodies in Tamil Nadu, Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in Tamil Nadu – Tamil Nadu Urban Development Project – Human Rights governance:

the Tamil Nadu State Human Rights Commission- Social Science Research: Meaning, nature and scope of social science research- Qualities of good researcher-Types of social science research:Historical-Descriptive-Empirical-Experimental-Qualitative-Quantitative-Hypothesis-Variables-Sampling: Probability and Non-Probability sampling – Methods of Data Collection: Primary and Secondary data- Observation-Schedule-Survey-Interview-Questionnaire-Measurement- Data Analysis-Tabulation-Inferences-Research Design and Report.

### **Unit – XIII:**

Social work research - Scientific Method: Objectivity, Scientific attitude, Ethics in research; Types of Research: Applied and Pure, Quantitative and Qualitative, Mixed methods, Participatory, Action research, Evaluative, Field based research. Research as a method in Social Work. Research process: Classification of Variables, Concepts, Constructs, identifying and formulating research problem, research questions, defining objectives, hypotheses. Research Designs: Exploratory, Descriptive, Diagnostic, Experimental, Evaluative and Participatory. Sampling Methods : Probability and Non-probability sampling techniques. Data Collection: Types of data, data collection methods, Questionnaire, Interview Schedule, Interview Guide, Observation (Participatory and non participatory) Qualitative Research techniques: FGDs, In-depth interview, Transcription, Themes, Illustrative quotes. Appreciative inquiry technique. Photo voice technique. Social Audits. Triangulation and Iteration.

### **Unit – XIV:**

Project evaluation - Project identification and formulation – Classification of projects, Project objectives, Project life cycle and phases, Project Planning and Organization. Project feasibility analysis (Financial, Technical) Market Survey, Demand analysis, Forecasting and Projection. Terms of reference: Area of study, documents needed, process, time frame, Team members. Evaluation design; Types of Evaluation; Project design: Time management, sequencing and scheduling, Network Analysis, CPM and PERT, Logical Framework Approach (LFA), Problem Analysis and Problem Tree. Log Frame Matrix, Social Cost – Benefit analysis, Environmental Impact Assessment, Legal aspects and clearance. Factors such as efficiency, effectiveness and sustainability of the project. Project appraisal and Implementation: Project Appraisal methods: (Financial, Technical) Project Financing, Project Resource mobilization, Negotiation, Decision making, Project control and Monitoring techniques, Project evaluation: Tools of Evaluation: Ladder of Life (UN tool). Community impact assessment, Holistic World View Analysis, Vulnerability Assessment, Impoverishment assessment, FGDs and Reporting on Evaluation.

### **UNIT - XV:**

Basics and Major areas of Management - Concept and Foundations of Management – Managerial Functions – Planning and decision making, Organizing, co-ordination and control – Role of Manager – Managerial skills – Management of innovation –Personality Theories and Determinants – Meaning and Process of perception – Motivation Concepts, Theories and Applications. Leadership – Theories and Styles – Quality of Work Life (QWL) – Quality Circles (QC) –Management of Conflicts in Organizations –

Demand analysis and forecasting – cost functions – Break-Even-Analysis - Theory of firm-profit maximization and sales maximization – Pricing decisions under different market structures. National income- GNP, GDP, Gross Domestic savings – Monetary and Fiscal policies – Business cycle. Fundamentals of operations management – Aggregate production planning, capacity planning – plant design – process planning – plant size and scale of operations – Management of facilities –Production control – Supply chain management - Quality management – statistical process control-role and importance of material management – Modern production concepts – JIT, Kaizen, Japanese 5's framework. Nature and scope of financial management – finance function-valuation concepts and Valuation of securities- financing decisions- sources of finance-cost of capital and capital structure – Investment decisions – Capital budgeting – Working capital management – Dividend decisions. Marketing Management – evolution and scope – Marketing strategy formulation and components of marketing plan – Segmenting and targeting the market – Positioning and differentiating of the market – Analyzing competition – Analyzing consumer markets – Industrial buyer behavior – Marketing research – Product strategy – Pricing strategies – Designing and managing Marketing channels – Building customer satisfaction –Ethics in marketing – Consumer protection - Concepts and policies of HRM – HRM functions – Future challenges of HRM-Human resource planning – Job analysis – Job evaluation – Recruitment and selection – Training and development – Promotion and transfer – compensation – performance appraisal and 360 degree feedback – HR audit – Handling of sexual harassment in the work place-current trends and issues in HRM. Nature and scope of strategic management – Strategic intent, vision, objectives and policies – Process of strategic planning and implementation – Environmental analysis and internal analysis – SWOT analysis – Tools and techniques for strategic analysis – Impact matrix – The experience curve – BCG matrix – Balanced Score Card - Du Pont's control model.

### **UNIT - XVI:**

Research methodology and management information system - Research – meaning, scope and objectives-types of research – research design-Data collection and Tabulation – Questionnaire design – Scaling technique – sources of secondary data– Sampling – Probability – Correlation and Regression Analysis – Tests of Significance – Normal distribution, Chi-square, F and t tests, ANOVA, time series and forecasting decision theory, index numbers – Multi-Variant analysis, Factor analysis – Discriminate analysis – report writing – Types of Report – structure of the Report – Guidelines for Report writing . Conceptual foundations of information systems – Types of information systems - Element of information system – Data Vs. Information – information requirement at various levels – data processing – data base – Data Entry -Development and Management – Systems analysis and design – Trends in information technology – Flexibility in information systems – User involvement – Evaluation of information systems – Security and ethical challenges.

### **Unit – XVII :**

Algebra and Differential Equations - Groups: Groups – Sub groups – Normal subgroups and quotient subgroups – Homomorphisms – Automorphisms – Cayley's Theorem – Rings: Rings - Special class sub rings - Homomorphisms – Ideals and Quotient Rings – Vector Spaces: Basic Concepts – Linear Independent and Bases – Inner Product

Spaces – ODE: ODE with constant coefficients – ODE with variable coefficients – Higher order ODEs – PDE: First order PDE - Second order PDE – Elliptic, parabolic, and hyperbolic PDEs.

### **Unit – XVIII :**

Analysis - Real Analysis: Properties of monotonic functions - Functions of bounded variations – Total variations – Additive property of total variation – Total variation on  $[a,x]$  as a function of  $x$  - Continuous functions of bounded variations – Infinite Series: Absolute and conditional convergence – Dirichlet's test and Abel's test Rearrangement of series – Riemann's theorem on conditionally convergent series.– Complex Analysis: Differentiability and Cauchy-Riemann Equations – Harmonic Functions – Power Series as an Analytic Function – Complex Integrations – Cauchy Integral Formula – Morera's Theorem – Existence of Harmonic Conjugate – Taylor's Theorem – Conformal mappings – Functional Analysis: Metric Spaces – Convergence, completeness and Baire's Theorem - Continuous mappings - Space of continuous functions - Euclidean and Unitary spaces - Topological Spaces: Basis for a Topology – The Product Topology – The Metric Topology – Connected Spaces – Connected Subspaces of the Real Line – Components and Local Connectedness. Decision Making: Basic Statistics: Moments – Mean – Variance – Standard deviations – Linear regression – Rank correlations – Attributes – Index Numbers. Linear Programming Problem: Graphical Methods – Travelling Salesman Problem – Assignment Problem – Simplex Methods.

### **Unit - XIX:**

Anthropology, meaning scope and relationship with other disciplines particularly social sciences, humanities etc. Main branches, their scope, The nature of culture, The nature of society: concept of society, society and culture, social institutions, social stratification Marriage: Definition and universality, Family, Kinship, Economic organization: meaning, scope, and relevance of economic anthropology, Religion Research methods in Anthropology - Field work tradition in Anthropology - Distinction between techniques, methods, methodology - Tools of data collection, observation, interview, schedules, case study, genealogy etc.

### **Unit - XX:**

Evolution of the Indian culture and civilization: Palaeolithic, Neolithic, Harrappan cultures; Tribal cultures of India, Brief ethnographic details of Tribes of Tamil Nadu. Caste system in India: Structure and characteristics, theories of origin of caste, Dominant caste. Indian village: Indian village as a social system, peasant cultures. Cultural change in Indian Society: Sanskritization, Westernization, Modernization, Post – Modernism, Globalization ; Problems of the tribal communities a) poverty b) low literacy c) health Development of forest policy and Tribals Constitutional safe guards for ST/SC, Role of Anthropology in Tribal and Rural development. Demographic profile of India – Ethnic and Linguistic elements in the Indian population and their distribution. Gender issues in Tamil Nadu.