

જા.ક. ૫૧/૨૦૧૮-૧૯

જગ્યાનું નામ: સંશોધન અધિકારી, ગુજરાત આંકડાકીય સેવા, વર્ગ-૨

ભાગ-૧ અને ભાગ-૨ ના ૧૮૦ મિનિટના સંયુક્ત પ્રશ્નપત્રની પ્રાથમિક કસોટીનો અભ્યાસક્રમ

પ્રાથમિક કસોટીનો અભ્યાસક્રમ	
પ્રશ્નપત્ર-૧	
માધ્યમ: ગુજરાતી	કુલ ગુણ : ૧૦૦
૧	ભારતની ભૂગોળ- ભૌગોલિક, આર્થિક, સામાજિક, કુદરતી સંસાધન અને વસ્તી અંગેની બાબતો- ગુજરાતના ખાસ સંદર્ભ સાથે
૨	ભારતનો સાંસ્કૃતિક વારસો- સાહિત્ય, કલા, ધર્મ અને સ્થાપત્યો- ગુજરાતના ખાસ સંદર્ભ સાથે
૩	ભારતનો ઇતિહાસ- ગુજરાતના ખાસ સંદર્ભ સાથે
૪	ભારતની અર્થવ્યવસ્થા અને આયોજન
૫	<u>ભારતીય રાજનીતિ અને ભારતનું બંધારણ:</u> (૧) આમુખ (૨) મૂળભૂત અધિકારો અને ફરજો (૩) રાજ્યનીતિના માર્ગદર્શક સિદ્ધાંતો (૪) સંસદની રચના (૫) રાષ્ટ્રપતિની સત્તા (૬) રાજ્યપાલની સત્તા (૭) ન્યાયતંત્ર (૮) અનુસૂચિત જાતિ, અનુસૂચિત જનજાતિ અને સમાજના પછાત વર્ગો માટેની જોગવાઈઓ (૯) એટર્ની જનરલ (૧૦) નીતિ આયોગ (૧૧) પંચાયતી રાજ (૧૨) નાણા પંચ (૧૩) બંધારણીય તથા વૈધનિક સંસ્થાઓ- ભારતનું ચૂંટણી પંચ, સંઘ લોક સેવા આયોગ, રાજ્ય લોક સેવા આયોગ, કોમ્પ્ટ્રોલર એન્ડ ઓડિટર જનરલ; કેન્દ્રીયસતર્કતા આયોગ, લોકપાલ તથા લોકાયુક્ત અને કેન્દ્રીય માહિતી આયોગ
૬	સામાન્ય બૌદ્ધિક ક્ષમતા કસોટી
૭	સામાન્ય વિજ્ઞાન, પર્યાવરણ અને ઈન્ફર્મેશન એન્ડ કોમ્યુનિકેશન ટેકનોલોજી
૮	ખેલ જગત સહિત રોજબરોજના પ્રાદેશિક, રાષ્ટ્રીય અને આંતરરાષ્ટ્રીય મહત્વના બનાવો

Syllabus of Preliminary Test	
Paper-1	
Medium: Gujarati	Total Marks- 100
1	Geography of India-Physical, Economic, Social, Natural Resources and population related topics- with special reference to Gujarat
2	Cultural heritage of India-Literature, Art, Religion and Architecture- with special reference to Gujarat
3	History of India with special reference to Gujarat
4	Indian Economy and Planning
5	<u>Indian Polity and the Constitution of India:</u> (1) Preamble (2) Fundamental Rights and Fundamental Duties (3) Directive Principles of State Policy (4) Composition of Parliament (5) Powers of the President of India (6) Powers of Governor (7) Judiciary (8) Provisions for Scheduled Castes, Scheduled Tribes and backward classes of the society (9) Attorney General (10) NITIAayog (11) Panchayati Raj Institutions (12) Finance Commission (13) Constitutional and Statutory Bodies: Election Commission of India, Union Public Service Commission, State Public Service Commission, Comptroller and Auditor General; Central Vigilance Commission, Lokpal and Lokayukta, Central Information Commission
6	General Mental Ability
7	General Science, Environment and Information & Communication Technology
8	Daily events of Regional, National and International Importance including Sports

**Syllabus for the Preliminary Examination for the recruitment of Research
Officer, Gujarat Statistical Service, Class-II**

<u>Marks-200</u>	<u>Questions-200</u>	<u>Medium-English</u>
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1. 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.

2. 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.

3. 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-eighth 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

4. LINEAR MODELS:

Theory of linear estimation, Gauss-Markov linear models, estimable functions, error and estimation space, normal equations and least square estimators, estimation of error variance, estimation with correlated observations, properties of least square estimators, generalized inverse of a matrix and solution of normal equations, variances and co variances of least square estimators. One way and two-way classifications, fixed, random and mixed effects models. Analysis of variance (two-way classification only),

5. SAMPLING THEORY:

Principles of sampling, sampling and non-sampling errors, Simple Random Sampling, Stratified Random Sampling, Systematic sampling, cluster sampling Ratio and regression estimates, non-response, sampling with

varying probability of selection, Hurwitz-Thompson estimator, Des Raj estimator, PPS sampling, double sampling, Multistage and Multiphase sampling.

6. OPERATIONS RESEARCH:

Definition and scope of O.R. different types of models. Replacement models and Sequencing theory, Inventory problems. Deterministic and probabilistic models. Queuing theory, characteristics queue. Different models/M/1, M/M/C. Linear programming, duality in linear programming Revised Simplex method, Dual simplex method and Sensitivity analysis. Kunh-Tucker conditions for optimality. Solution to inventory with unknown density function, warehousing problem. Machine maintenance models.

7. ECONOMETRICS:

Nature of econometrics, the general linear model (GLM) and its extensions, ordinary least squares (OLS) estimation and prediction, generalized least squares (GLS) estimation and prediction, heteroscedastic disturbances, pure and mixed estimation. Auto correlation, its consequences and tests. Theil BLUS procedure, estimation and prediction, multi-collinearity problem, its implications and tools for handling the problem, ridge regression. Linear regression and stochastic regression, instrumental variable estimation, errors in variables, autoregressive linear regression, lagged variables, distributed lag models, estimation of lags by OLS method, Koyck's geometric lag model. Simultaneous linear equations model and its generalization, identification problem, restrictions on structural parameters, rank and order conditions. Estimation in simultaneous equations model, recursive systems, 2 SLS estimators, limited information estimators, k-class estimators, 3 SLS estimator, full information maximum likelihood method, prediction and simultaneous confidence intervals

8. INDUSTRIAL STRUCTURE AND ECONOMIC GROWTH:

Pattern of industrialization-Public and Private; large and small industries
Theories of Industrial location – Indian experience Industrial productivity –
measurement, Partial and total trends Industrial Finance in India Industrial
Labor – Problems, Policies and reforms in India Economic Reforms and
industrial growth

9. POPULATION AND ECONOMIC DEVELOPMENT:

Interrelation between population, development and environment,
sustainable development Malthusian theory of population, Optimum theory
of population, theory of demographic transition, population as ‘Limits to
Growth’ and as ‘Ultimate Source’ Concepts of Demography – Vital rates,
Life tables, composition and uses, Measurement of fertility – Total fertility
rate, gross and net reproduction rate – Age pyramids, population projection
– stable, stationary and quasi-stationary population; characteristic of Indian
population through recent census Poverty in India – Absolute and relative;
analysis of poverty in India Environment as necessity – amenity and public
goods; causes of environmental and ecosystem degeneration – policies for
controlling pollution – economic and persuasive; their relative effectiveness
in LDCs; Relation between population, poverty and environmental
degradation – micro planning for environment and eco-preservation –water
sheds, joint forest management and self-help groups Role of State in
environmental preservation – Review of environment legislation in India

10. BUSINESS ECONOMICS:

Nature and uses of Business economics, Concept of Profit and Wealth
maximization. Demand Analysis and Elasticity of Demand, Indifference
Curve Analysis

Utility Analysis and Laws of Returns and Law of variable proportions Cost,
Revenue, Price Determination in different market situations: Perfect
Competition, Monopolistic competition, Monopoly, Price Discrimination
and Oligopoly, Pricing Strategies.

11. OFFICIAL STATISTICS:

State and National official statistical system: Official Statistics: (a) Uses, Users, Reliability, Relevance, Limitations, Transparency, its visibility (b) Compilation, Collection, Processing, Analysis and Dissemination, Agencies Involved, Methods

National Statistical Organization: Vision and Mission, NSSO and CSO; roles and responsibilities; Important activities, Publications etc.

National Statistical Commission: Constitution, its role, functions etc.; Legal Acts/ Provisions/ Support for Official Statistics; Important Acts and Rules regarding collection of Statistics.

Sector Wise Statistics: Agriculture, Health, Education, Women and Child etc. Important Surveys & Census, Indicators, Agencies and Usages etc.

State and National Accounts: Definition, Basic Concepts; issues; the Strategy, Collection of Data and Release.

12. Evolution of Statistical methods and institutions in India. Contribution of P.C.Mahalanobis and others.

13. Recent Advancements and Development in the field of Statistics/ Economics/ Mathematics & Planning.