



ગુજરાત જાહેર સેવા આયોગ

છ-૩ સર્કલ પાસે, છ રોડ, સેક્ટર-૧૦/એ, ગાંધીનગર-૩૮૨૦૧૦

ખ.ક.૫૭/૨૦૨૦-૨૧

જગ્યાનું નામ: સરકારી વિનયન, વાણિજ્ય અને વિજ્ઞાન કોલેજે ખાતે
આંકડાશાસ્ત્ર વિષયના મદદનીશ પ્રાધ્યાપક, વર્ગ-૨ (શિક્ષણ વિભાગ)

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

પ્રાથમિક કસોટીનો અભ્યાસક્રમ ભાગ -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	<p><u>ભારતીય રાજનીતિ અને ભારતનું બંધારણ:</u></p> <p>(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; કેન્દ્રીય સતર્કતા આયોગ, લોકપાલ તથા લોકાયુક્ત અને કેન્દ્રીય માહિતી આયોગ</p>
૬	સામાન્ય બૌદ્ધિક ક્ષમતા કસોટી
૭	સામાન્ય વિજ્ઞાન, પર્યાવરણ અને ઇન્ફર્મેશન એન્ડ કોમ્યુનિકેશન ટેકનોલોજી
૮	ખેલ જગત સહિત રોજબરોજના પ્રાદેશિક, રાષ્ટ્રીય અને આંતરરાષ્ટ્રીય મહત્વના બનાવો

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Assistant Professor of Statistics in Govt. Arts, Science, Commerce College

Class-II

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 Assistant Professor (Statistics), Class-II**

Medium: English

1. PROBABILITY THEORY AND MEASURE THEORY:

Classical and axiomatic definitions of probability, simple theorems on Probability with examples, conditional probability, Bayes theorem, discrete And continuous random variables, probability mass function and probability density function, moments and moment generating functions, Chebychev's, inequality, convergence in probability, Weak law of large numbers, Strong law of large numbers, simple form of Central limit theorem

Measurable and measure spaces: Extension of measure, signed measures, Fatou's lemma, dominated convergence theorem. Absolute continuity, Radon Nikodym Theorem, Fubini's theorem. Sequence of events and random variables: Zero-one laws of Borel and Kolmogorov. Almost sure convergence, convergence in mean square, Central limit theorems of Liapounov and Lindberg-Feller.

2. STATISTICAL INFERENCE

Methods of estimation: Maximum Likelihood method, method of moments, Minimum chi-square method, least squares method. Properties of estimators:

Unbiasedness, efficiency, sufficiency and consistency. Rao-Blackwell theorem, Uniformly Minimum Variance Unbiased Estimators (UMVUE). Simple problems of Constructing confidence intervals for mean, variance and proportions in single populations, Tests of hypothesis: Simple and composite, two types of errors, critical regions, randomized tests, most powerful and uniformly most powerful tests, LRT (Likelihood Ratio test). Sign test, Run test, Median test, Wilcoxon test, rank Correlation methods.

Statistical decision problem: on randomized and randomized decision rules, risk function and admissibility, Bayes' rule, minimax rules, least favorable distributions, complete class and minimal complete class.

Decision problem for finite parameter space, convex loss function, role of sufficiency. Admissible, Bayes and Minimax estimators Completeness, Lehman –Scheffe’s theorem, Unique estimators, Exponential family of distributions, Test of a simple hypothesis against composite alternatives. Tests with Neyman structure. Uniformly Most Powerful Unbiased tests and locally most powerful tests. Properties LRT (Likelihood Ratio Test) Derivation of various test of significance using LRT

3. 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.

4. LINEAR MODELS AND REGRESSION

Gauss- Markov models, BLUE (Best Linear Unbiased Estimators) estimability of parameters, tests for linear hypotheses, Fixed effects, Random effects and mixed effects models and their analysis. Analysis of Covariance (ANCOVA) multiple regression analysis and logistic regression analysis, Polynomial models and use of orthogonal polynomials, Stepwise regression analysis, and one way classification viewed on a regression problem.

5. MULTIVARIATE ANALYSIS

Multivariate Normal distribution and its density free approach, properties of Multi variate Normal distribution, marginal and conditional distributions. Maximum likelihood estimation of the parameters. Wishart’s distribution (without derivation) and its properties, Problem of classification and discrimination, Mahalanobis $-D^2$.

Testing of mean vectors, Hotelling’s T^2 distribution (without derivation) and its applications, Principal components Analysis, factor analysis, One-way and two - way Multivariate Analysis of Variance (MANOVA)

6. DESIGN OF EXPERIMENTS

ANOVA: one-way, two way and three way classifications. Principles of Design of Experiment, Completely Randomized Design (CRD), Randomized Block Design (RBD) Latin Square Design (LSD), Factorial experiments, confounding and fractional replication, Split plot design. Design for study of response surfaces. Incomplete block designs, Balanced Incomplete Block Designs (BIBD), partially incomplete Block Designs (PBIBD).

7. TIME –SERIES ANALYSIS

Discrete parameter stochastic processes; strong and weak stationarity; auto covariance and auto correlation; correlogram analysis, Moving average method, autoregressive moving average process, Estimation of parameters in ARIMA models; forecasting.

8. INDUSTRIAL STATISTICS AND LIFE TESTING EXPERIMENTS

Control charts for variables and attributes; single and double sampling plans; OC and ASN functions, sequential sampling plans. AOQL; ATI; acceptance sampling by Variates. Tolerance limits.

Life testing experiments; hazard functions, reliability function; IFR; IFRA, DFR;DFRA distributions, series and parallel systems. Life testing distributions: Exponential, Log-Normal and Weibull.

9. 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