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**Uttar Pradesh Public
Service Commission
(UPPCS Mains)
Exam Syllabus**

Optional Subjects
Statistics

:: PAPER - I ::

Probability theory and statistical Application

Group –A- PROBABILITY THEORY : Sample space and events, Classical and Axiomatic Definitions of probability, Laws of total probability, Conditional Probability, Independence of Events, Theorem of Compound Probability Bayes. Theorem and its Applications. Random Variable Discrete and Continuous. Distribution Function; Elementary Properties of Distribution Function, Bivariate Distribution and associated Marginal and Conditional Distributions. Mathematical Expectation and Conditional Expectation, Moments, Moment Generating and Characteristic Functions. Markov and Chebyshev Inequalities, Convergence in probability, Weak Law of Large Numbers and Central Limit Theorem for independently and Identically Distributed Random Variables, Some Standard Discrete and Continuous Distributions, Viz, Binomial, Poisson, Hypergeometric, Geometric Negative Binomial, Multinomial, Uniform, Normal, Exponential, Gamma, Beta and Cauchy Bivariate Normal Distribution.

GROUP-B, STATISTICAL APPLICATIONS: Method of least Squares Correlation and Linear Regression, Product Moment correlation, Rank Correlation, Intra-Class Correlation and Correlation Ratio, Partial and Multiple correlation and Regression for Three Variables. One- Way and Two-Way Analysis of Variance with equal number of Observations per Cell Design of Experiments-Basic Principles of Design of Experiment, Completely Randomized Design, Randomized Block Design, Latin Square Design, 2 and 2 Factorial 2 3 Experiments, Missing Plot Technique Sources of Demographic Data, Stable and Stationary Populations, Measures of Fertility and Mortality, Life Tables, Simple Population Growth Models. Index Numbers and Their Uses, Index Numbers due to Laspeyres, Paasche, Marshall- Edgeworth and Fisher, Tests for Index Numbers, Construction of Price Index Number and Cost of Living Index Number. Time- Series and its Components, Determination of Trend and Seasonal Indices, Periodogram and Correlogram Analysis, Variate Difference Method.

:: PAPER - II ::

STATISTICAL INFERENCE AND MANAGEMENT

GROUP-A-STATISTICAL INFERENCE: Properties of Estimators, Consistency, Unbiasedness, Efficiency, Sufficiency, Cramer-Rao Inequality for Minimum Variance Unbiased Estimator, Rao-Blackwell Theorem. Estimation Procedures, Method of Moments and Method of Maximum Likelihood, Interval Estimation Simple and Composite Hypotheses, Two Kinds of Errors, Critical Region, Level of Significance size and Power Function, Unbiased Tests, Most- Powerful and Uniformly Most Powerful Tests, Neyman-Pearson Lemma and its Application, Likelihood Ratio Test. Tests based on t, Chi-Square, z and F-distributions. Large Sample Tests. Distributions of order Statistics and Range, NonParametric Tests, Viz... Sign Test, Median Test, Run Test, Wilcoxon-Mann - Whitney Test.

GROUP-B-STATISTICAL MANAGEMENT: Nature of Operations Research Problems, Linear Programming Problem and the Graphical Solution in simple Cases, Simplex method, Dual of Linear Programming Problem Assignment and Transportation Problems, Zero sum two-person game, Pure and Mixed Strategies, Value of a Game. Fundamental Theorem, Solution of 2x2 Games, Nature and Scope of Sample Survey, Sampling Vs. Complete Enumeration, Simple Random Sampling from Finite Populations with and without Replacement, Stratified Sampling and Allocation Principles, Cluster Sampling with Equal Cluster Size. Ratio, Product and Regression Methods of Estimation and Double Sampling, Two Stage Sampling with Equal First Stage Units, Systematic Sampling. Statistical-Quality Control, Charts for variables and Attributes.

Acceptance-Sampling, OC, ASN and ATI Curves, Producers risk and Consumer's risk. Concept of AQL, AOQL and LTPD, Single and Double Sampling Plans Scaling Procedures, Scaling of Test items Test Scores, Theory of Tests, Parallel Tests, True Score, Reliability and Validity of Tests.

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