

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF STATISTICAL OFFICER, AGRICULTURE DEPARTMENT

- 1. Descriptive Statistics:** Types of Data, Collection, Classification, Tabulation and Diagrammatic Presentation of data. Measures of Central Tendency, Dispersion, Moments, Skewness and Kurtosis.
- 2. Correlation and Regression:** Karl Pearson and Rank correlation coefficients, Multiple and Partial Correlation, Linear Regression. Method of Least Squares.
- 3. Probability:** Classical and Axiomatic approaches of probability, Conditional Probability, Bayes theorem, Simple problems on Probability. Random variable and Mathematical Expectation with applications, Chebychev's inequality .
- 4. Probability Distributions:** Uniform, Binomial, Negative Binomial, Poisson, Exponential, Rectangular, Normal, Gamma, Cauchy, Beta Distributions with properties and applications. Central limit theorem.
- 5. Sampling Distributions:** Chi-square, t and F Distributions and their applications.
- 6. Multivariate Analysis:** Multivariate Normal Distribution, Hotelling's T^2 distribution. Discriminant, Principal Component and Factor Analysis. Multiple Regression Analysis, Multi Colinearity. Wishart's distribution and its properties.
- 7. Theory of Estimation:** Point and Interval estimation, Properties of estimator, Methods of Estimation – Least Squares and Maximum Likelihood estimates, Cramer-Rao inequality. Confidence intervals and confidence limits.
- 8. Testing of Hypothesis:** Concept of Hypothesis, Types of error in testing, Critical Region and level of significance, p values, Neyman Pearson Lemma. One and two tailed tests based on small and large samples.
- 9. Non-Parametric Tests:** Run, Sign, Median, and Kolmogorov- Smirnov one and two sample tests.
- 10. Design of Sample Survey:** Sampling Unit, Sampling frame, Sampling fraction, Sampling with and without replacement, Population Parameter and Sample estimator, efficiency, accuracy and precision, sampling and non sampling errors, Simple random sampling, Probability proportion to Size with replacement, Sampling with varying probability- with and without replacement, stratified random sampling, systematic sampling, cluster sampling, multistage sampling, ratio and regression methods of estimation.
- 11. Design of Experiments:** Analysis of variance for one way and two way classified data, Transformation of data, Uniformity trials, Principles of Design of experiments .Completely Randomized Design,

Randomized Block Design, Latin Square Design, missing plot techniques. 2ⁿ factorial experiments, Complete and Partial confounding. Split Plot and Strip Plot designs, BIB and PBIB designs. Analysis of covariance.

12. Time Series Analysis: Components, Measurements of Trend, Seasonal, Cyclical and irregular variations, Autocorrelation, Auto regression, Periodogram.

13. Index Number: Uses, types and limitations of index numbers, construction of index numbers, simple and weighted aggregate method, Simple and weighted average price-relatives, Chain base index numbers, Base shifting, Splicing and Deflating of Index numbers, Cost of Living index numbers.

14. Vital Statistics: Collection of vital statistics, Measurement of population, Measures of Mortality and Fertility rates, life tables, Population growth, Gross reproduction Rate, Net reproduction Rate.

15. Statistical Organization in India: CSO, NSSO, National Income Statistics, Population Census.

16. Agriculture Statistics: Importance of Statistics in Agriculture, Agricultural statistical system in India, Agricultural Census, Livestock Census, Land use statistics. Agriculture Survey. National Agricultural Production Index, Crop production Index.

17. Statistical Genetics: Physical basis in inheritance, Analysis of segregation, Detection and Estimation of Linkage for qualitative characters. Genetic Variance and its partitioning. Correlation between Relatives. Heritability, Repeatability and Genetic correlation.

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Pattern of Question Paper :

- 1 Objective Type Paper.
- 2 Maximum Marks : 100
- 3 Number of Questions : 100
- 4 Duration of Paper : Two Hours.
- 5 All Questions carry equal marks.
- 6 There will be **Negative Marking**.

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