

# **RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**

## **SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF STATISTICAL OFFICER PLANNING (ECONOMICS & STATISTICS) DEPARTMENT**

### **Part-A**

#### **General Knowledge of Rajasthan**

**-40 Questions**

#### **History & Culture of Rajasthan:**

Historical Rajasthan: - Pre and Proto-historical sites of Rajasthan. Important historical centers of early Christian era. Prominent rulers of major Rajput dynasties of Rajasthan and their achievements & contributions – Guhilas- Sisodiyas, Chauhans, Rathores and Kachchawas.

Emergence of Modern Rajasthan: Agents of Social Awakening in Rajasthan during 19<sup>th</sup> and 20<sup>th</sup> Centuries. Political Awakening: role of newspapers and political institutions. Prajamandal movement in various princely states in 20<sup>th</sup> Century. Integration of Rajasthan.

Social Life in Rajasthan: Fairs and festivals; Social customs and traditions; attires and ornaments, Personalities of Rajasthan.

Art of Rajasthan: Architectural tradition of Rajasthan- temples, forts and palaces from ancient to modern period; various schools of paintings which developed during medieval period; Classical Music and Classical Dance, Folk Music & Instruments; Folk Dances & Drama.

Religious Life: Religious communities, Saints and Sects in Rajasthan. Folk deities of Rajasthan.

Language & Literature: Dialects of Rajasthani Language, Literature of Rajasthani language and Folk literature.

#### **Geography of Rajasthan:**

Major physiographic divisions of Rajasthan. Drainage characteristics. Weather conditions. Vegetation, forest and Soil, Natural Resources, Minerals, livestock population of Rajasthan. Wild life and its conservation. Environmental Conservation, Droughts and Desertification, Major Irrigation Projects. Agricultural Crops and Problems. Population growth and Tribes of Rajasthan, Handicrafts and Tourism. Power resources with non-conventional energy sources.

New Schemes & Initiatives taken recently for welfare & development in Rajasthan.

Collection, Classification, Tabulation and diagrammatic presentation of data. Measures of Central Tendency: Mean, Mode, Median, Harmonic mean, Geometric mean, Properties, applications, merits and demerits. Measures of Dispersion: Range, mean deviation, standard deviation, variance their applications, properties, merits and demerits. Moments: Raw moments, central moments, Factorial moments. Skewness and Kurtosis: Various measures of Skewness and Kurtosis, their properties.

**Correlation and Regression:** Karl Pearson and rank correlation coefficients. Multiple and partial correlations (for three variables), Linear regression, fitting, regression coefficients, properties, angle between two lines of regression.

**Probability:** Classical and Axiomatic approaches of probability, Conditional Probability, Bayes theorem, Random variables and Mathematical expectation with applications.

**Probability Distributions:** Discrete distributions: Uniform, Poisson, exponential, rectangular, geometric, hypergeometric, power series distributions, properties and applications. Continuous Distributions: Normal, uniform, Beeta, Gamma. Exponential, Weibul, Logistic, Cauchy distributions, properties and applications, central limit theorem.

**Sampling distributions:** Chi-square, t and F distribution (central and non-central), properties and applications.

**Multivariate Analysis:** Multivariate Normal Distribution, Hotellings  $T^2$  and Discriminant Analysis, Wishart distribution and its properties.

**Theory of Estimation:** Point and Interval estimation, Properties of estimator, Methods of Estimation- Least Square and Maximum Likelihood estimators and their properties. Crammer- Rao Inequality, Blackwell theorem, confidence intervals and limits for large samples.

**Testing of Hypothesis:** Concept of Hypothesis, Types of error in testing, Critical Region and level of significance, Neyman Pearson Lemma and two tailed tests based on small and large samples, likelihood ratio test.

**Non-Parametric Tests:** Run, Sign, Median, and Kolmogorav Smirnov one sample test, Mann- Whitney- Wilcoxon U- test.

**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 and without replacement, stratified random sampling, systematic sampling, cluster sampling, multistage sampling, ratio and regression methods of estimation.

**Design of Experiments:** Analysis of variance for one way and two way classified data, Principles of Designs, Completely Randomised Designs, Randomised Block Designs, Latin

Square Designs,  $2^n$ - factorial experiments, Split plot and Strip plot Design, BIBD, Complete and Partial confounding.

**Time Series Analysis:** Components, Measurements of Trend, Seasonal, Cyclical and irregular variations, Periodogram analysis.

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

**Vital Statistics:** Collection of vital statistics- Measures of Mortality, Law of mortality, fitting of Makeham's law, Fertility rates, life tables, Abridged life-table (King's method), Population growth.

**Statistical Organization of India:** CSO, NSSO, National Income Statistics, Population Census, Agricultural Census, Livestock Census.

**Micro Economics:** Consumer Behaviour- Cardinal and Ordinal Approach, Concept of elasticity, Producer equilibrium, Price determination in Perfect competition, Monopoly Monopolistic Competition, Pareto optimal conditions.

**Macro Economics:** National Income and Methods of measuring national income, Consumption and Investment function, Money supply, High powered Money and Money multiplier Central and Commercial banks.

**Public finance:** Role of Government in organised society, Private goods, Public goods, Merit goods, Market failure, Budgetary deficits, GST- Fiscal Sector reforms.

**International Economics:** Meaning and Components of Balance of payments, Trends in Exports and Imports, Composition of Trade, Recent Foreign Trade policy.

**Economics of Growth and Development:** Factors affecting growth. Poverty, inequality of income, Human development Index, Sustainable development.

**Indian Economy:** Agriculture reforms, Recent Industrial policy, Govt. schemes of unemployment and poverty alleviation. Impact of liberalization, Globalization and privatization on Indian Economy. Recent Monetary and Fiscal Policy, Niti Aayog, Covid 19- Impact on Indian Economy.

**Algebra:** Relation between roots and coefficients, repeated roots, elementary symmetric functions, Algebra of Matrices, Rank and determinant of Matrices. Eigen values and Eigen Vectors.

**Calculus:** Limits, Continuity properties of continuous function in closed intervals, differentiability, mean value theorem, Taylor's theorem, curvature, asymptotes, Partial differentiation and its applications. Rectification, quadrature, volume and surface of revolution.

**Differential Equations:** Linear and non-linear differential equation of first order, linear differential equation with constant coefficients, homogeneous differential equations. Partial differential equations of first and second order.

**Complex Analysis:** Analytic function, Cauchy Riemann equations, Cauchy's theorem, Cauchy's integral formulae, Power series, Laurent's Series, Singularities. Beta- Gamma functions.

**Special Functions and Integral Transforms:** Hypergeometric functions, Legendre's Polynomials, Bessel's function, Recurrence relations, orthogonal properties and generating functions, Laplace transforms and inverse Laplace transforms.

### **Fundamentals of IT and Computer Applications:**

Basic knowledge of Word Processing Software, formatting, alignment, graphs and charts, headers and footers, various tabs and options. Basics of Spreadsheet, Manipulation of cells, Formulas and Functions, Editing of Spread Sheet, Printing of Spread Sheet. Basics of Presentation Software, templates, wizards, slide show, building a presentation, various tabs and options. Accounting software basics. Basic knowledge of internet, internet security, types of cyber threats, digital signatures, secure seals, secure browsing. Digital payments and platforms, online banking, online payment modes, mobile wallets, E-commerce basics. GIS basics, e-governance in Rajasthan.

| <b>Scheme of Examination</b> |                                |                         |                    |                             |
|------------------------------|--------------------------------|-------------------------|--------------------|-----------------------------|
| <b>S. No.</b>                | <b>Subject</b>                 | <b>No. of Questions</b> | <b>Total Marks</b> | <b>Examination Duration</b> |
| Part-A                       | General Knowledge of Rajasthan | 40                      | 40                 | 2.30 Hours                  |
| Part-B                       | Concerned Subject              | 110                     | 110                |                             |
|                              | Total                          | 150                     | 150                |                             |

1. The competitive examination shall carry 150 marks and 150 questions of Multiple Choice Type questions.  
 2. There shall be one paper. Duration of Paper will be Two hours and Thirty Minutes.  
 3. Negative marking shall be applicable in the evaluation of answers. For every wrong answer one-third of the marks prescribed for that particular question shall be deducted.  
 Explanation :- Wrong answer shall mean an incorrect answer or multiple answers.

**उक्त पद हेतु आयोजित की जाने वाली परीक्षा के लिए ओ.एम.आर. उत्तरपत्रक में प्रश्नों के विकल्प भरने के संबंध में विशेष निर्देश:-**

- Each question has five options marked as 1, 2, 3, 4, 5. You have to darken only one circle (bubble) indicating the correct answer on the Answer Sheet using BLUE BALL POINT PEN.
- It is mandatory to fill one option for each question.
- If you are not attempting a question then you have to darken the circle '5'. If none of the five circles is darkened, one third (1/3) part of the marks of question shall be deducted.
- After solving question paper, candidate must ascertain that he/she has darkened one of the circles (bubbles) for each of the questions. Extra time of 10 minutes beyond scheduled time, is provided for this.

A candidate who has not darkened any of the five circles in more than 10% questions shall be disqualified.

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