51

Statistics
B.A./B.Sc.: Elective and Optional

Outlines of Tests

<table>
<thead>
<tr>
<th>Paper</th>
<th>Title of Course</th>
<th>Marks</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td></td>
<td>75</td>
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<tr>
<td>B</td>
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<td>75</td>
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<tr>
<td>C</td>
<td>Practical)</td>
<td>50</td>
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Syllabi and Courses of Reading

PAPER A

Candidates are required to attempt at least two questions from each Section

Section – I

DESCRIPTIVE STATISTICS (weight 2/10)


INDEX NUMBERS AND TIME SERIES (Weight 2/10)

Index Number:

SIMPLE REGRESSION AND CORRELATION (Weight 1/10)

Logic of regression and correlation. Scatter diagram, Simple linear regression model, least square estimators and their properties, standards error of estimate, Meaning and application of linear correlation coefficient. Properties of correlation coefficient correlation for bi-variate frequency distribution. Meaning derivation and application of Rank Correlation, tied ranks.

Section – II

PROBABILITY (Weight 2/10)

**DISCRETE RANDOM VARIABLE AND DISCRETE PROBABILITY DISTRIBUTIONS (Weight 2/10)**

Random variable, Distribution Function, Discrete random variable. Probability distribution of a discrete random variable. Joint Distribution of two discrete random variables, marginal and conditional distributions, mathematical expectation and it properties, mean, variance and moments. Concept of m.g.f and its properties. Uniform, Bernoulli, Binomial, Hyper geometric and poisson distributions, mean, variance and shape of these distributions and their properties. Application of these distributions with examples from various fields, Multinominal distribution (only application)

**CONTINUOUS RANDOM VARIABLES AND CONTINUOUS PROBABILITY DISTRIBUTIONS (Weight 1/10)**

Continuous random variables. Probability distribution of a single continuous random variable, probability density function and distribution function. Mean, variance and moments of continuous random variables. Uniform and Normal Distributions. Mean, Variance and shape of these distributions and their properties. Application of these distributions. Normal approximation to the Binomial and Poisson Distribution (only application). Fitting of Normal Distribution by area method

### PAPER B

Candidates are required to attempt at least two questions from each section

**Section – I**

**SAMPLING AND SAMPLING DISTRIBUTION (Weight 2/10)**


**STATISTICAL INFERENCE (Weight 2/10)**

Nature of statistical inference, point and interval estimation of parameter, properties of point estimator, confidence interval and its interpretation. Null and alternative hypothesis, simple and composite hypothesis. Type I and Type II errors. Level of significance. P-value and power of test (only concept and definition). Acceptance and rejection regions, one sided and two sided tests for paired and unpaired observations. Inference about proportion and difference between two proportions. Determination of sample size. (Application of Normal distribution and t-distribution)

**INFERENACE ABOUT VARIANCE (Weight 1/10)**

Introduction and application of Chi-square distribution: Interval estimation and test of hypothesis about population variance (interval estimation for variance-single sample) Introduction and application of F-distribution: Test of Hypothesis for equality of two variances.
Section – II

ANALYSIS OF COUNT DATA (Weight 1/10)

Chi-square test of independence, Chi-square test of goodness of fit, Chi-square test of homogeneity.

REGRESSION AND CORRELATION ANALYSIS (Weight 2/10)

Multiple Linear regression with two regressors, Coefficient of multiple determination, Partial and multiple correlation up to three variables. Inference of simple correlation and regression, partial and multiple correlation. Interval estimates and tests of hypothesis about parameters, mean prediction and individual prediction.

ANALYSIS OF VARIANCE AND BASIC EXPERIMENTAL DESIGNS(Weight 2/10)

Analysis of variance for one-way classification and two way classification. Multiple comparison tests, least significant difference and Duncans multiple range test. Basic principles of experimental design. Complete randomized, randomized completely Block and Latin Square Designs. Descriptions, Layout, Statistical analysis, advantages and limitations of these designs. Application of these designs (Analysis of all these designs for single Observation in each Cell).

PAPER C: PRACTICAL

<table>
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<th>Each Question of 18 marks</th>
<th>36 Marks</th>
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<tr>
<td>Practical Note Book</td>
<td>5 Marks</td>
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<tr>
<td>Viva Voce</td>
<td>9 Marks</td>
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Candidates are required to attempt one question from each section

Section – I

One question from each section of Paper A should be set.

Section – II

One question from each section Paper B should be set.

STATISTICS : OPTIONAL

Outlines of Tests

<table>
<thead>
<tr>
<th>Paper</th>
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<th>Mark</th>
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<tbody>
<tr>
<td></td>
<td>Optional Statistics</td>
<td>100</td>
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Syllabi and Courses of Reading

1. Introduction:
   Definition, characteristics and limitations of statistics, collection, classification and tabulation of data.
2. Graph and Diagrams:
   Bar and pie diagrams. Graphs of frequency distribution viz. Histogram, frequency polygon, frequency curve, cumulative frequency curve, Graphic interpolation.
3. Averages:
   Elementary knowledge and numerical illustrations of arithmetic mean, median, mode and weighted average. Time series: Smoothing of fluctuations by moving average method.
4. Dispersion:
Elementary knowledge and numerical illustrations of range, fractiles, quartile deviation, standard deviation, co-efficient of skewness and co-efficient of variation.

5. **Attributes and Chi-Square:**
   Concept of attribute, idea of independence and association, dichotomy, co-efficient of association, contingency table. Chi-square.

6. **Correlation:**
   Concept of regression, simple correlation and rank correlation with numerical illustrations.

7. **Sampling:**
   Concept of sampling. Definition of population and sampling unit. Purposive and random sampling. Drawing of a random sample without replacement from finite population.

**Books Recommended:**