Unit I: Mathematics

Basic concept of Limit, Continuity, and Differentiability. First and second order derivatives of a variety of non-trigonometric univariate functions. Maximum and minimum of a variety of non-trigonometric univariate functions.

Integration of a variety of non-trigonometric univariate functions by substitutions, by partial fractions and by parts. Standard definition of gamma integral and results involving it (without derivatives).

Unit II: Correlation & Regression


Concept of Regression. Principle of Least squares. Fitting of Regression lines. Important results relating to regression lines.

Unit III: Probability & Probability Distributions


Uniform (Discrete and Continuous), Bernoulli, Binomial, Poisson, Geometric, Exponential and Normal distributions.

Unit V: Population Studies

Unit wise Question Types with Marks Distribution of Pre-test Theory Examination

<table>
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<tr>
<th>Unit</th>
<th>Title</th>
<th>MCQ/Objective 1 Mark</th>
<th>SA-I 2 Mark</th>
<th>SA-II 3 Mark</th>
<th>LA 5 Mark</th>
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Practical syllabus for Pre-test Examination

Three experiments to be given in the examination as follows:

1. Scatter diagram. Correlation coefficient and Linear Regression.
2. Spearman’s Rank Correlation coefficient (without tie).
3. Applications and Fitting of Binomial Distributions.
4. Applications and Fitting of Poisson Distributions.
5. Applications and Fitting of Normal Distributions.

Marks Distribution of Pre-test Practical Examination

Full Marks: 30, Time: 3 Hours

1. Experiments (5 + 5 + 10) 20 Marks
2. Practical Note Book (PNB) 5 Marks
3. Viva-Voce 5 Marks
Syllabus for Test Examination

Theory Examination, Full Marks: 70, Time: 3 Hours

Unit IV: Sampling, Estimation & Testing of Hypotheses


Concept of Point estimation. Requirement of good estimator: Unbiasedness, Consistency, Efficiency. Elementary concept of MVUE & BLUE.

Statistical tests of Hypothesis- Null & alternative hypothesis. Simple & composite hypothesis, Critical region, Type-I and Type-II errors, Level of Significance and size of critical region, Power of a test. Tests of significance related to a single Binomial proportion, Poisson parameter and two binomial proportions using large sample approximations. Exact tests of hypothesis under normal set-up for a single mean, equality of two means and single variance. Frequency Chi-square test & Goodness of fit.

N.B.: Theory Syllabus of Pre-test examination is also included in Test examination.

Unit wise Question Types with Marks Distribution of Test Examination (Theory)

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<th>Unit</th>
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<th>SA-II 3 Mark</th>
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<td>12</td>
<td>18</td>
<td>30</td>
<td>70</td>
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</table>
Practical Examination syllabus of Test Examination

Three experiments to be given in the examination as follows:

1. Sampling distribution and estimation of population mean and its standard error under SRSWR and SRSWOR.
2. Large sample tests of a single mean, single proportion and difference of two proportions.
3. Pearson’s Chi-square tests.
4. Exact tests of hypotheses under normal set-up for a single mean, difference of two means and single variance.
5. Drawing of random sample from Uniform and Normal distributions

N.B.: Syllabus of Pre-test practical examination is also included in Test examination.

Marks Distribution of Test Examination (Practical)

Full Marks: 30, Time: 3 Hours

1. Experiments (5 + 5 + 10) 20 Marks
2. Practical Note Book (PNB) 5 Marks
3. Viva-Voce 5 Marks