Test Code: STB (Short Answer Type) 2016

Junior Research Fellowship for Research Course in Statistics

The candidates for research course in Statistics will have to take two short-answer type tests – STA and STB. Each test is of two-hour duration. Test STA will have about 10 questions of equal value, set from selected topics in Mathematics and Statistics at the undergraduate level. Test STB will have roughly 8 questions of equal value, on topics in Statistics at Master's level.

Syllabus for STB

(a)*Probability*: Basic concepts, elementary set theory and sample space, conditional probability and Bayes theorem. Standard univariate and multivariate distributions. Transformations of variables. Moment generating functions, characteristic functions, convergence in probability, first and second Borel-Cantelli lemmas, almost sure convergence, weak and strong laws of large numbers, convergence in distribution and central limit theorem. Markov chains.

(b) *Inference*: Sufficiency, minimum variance unbiased estimation, Bayes estimates, maximum likelihood and other common methods of estimation. Optimum tests for simple and composite hypotheses. Elements of sequential and non-parametric tests. Analysis of discrete data - contingency chi-square.

(c) *Multivariate Analysis*: Standard sampling distributions. Order statistics with applications. Regression, partial and multiple correlations. Basic properties of multivariate normal distribution, Wishart distribution, Hotelling's T^2 and related tests.

(d) *Design of Experiments*: Inference in linear models. Standard orthogonal and non-orthogonal designs. Analysis of general block designs. Factorial experiments. One and two-way ANOVA.

(e) *Sample Surveys*: Simple random sampling, Systematic sampling, PPS sampling, Stratified sampling. Ratio and regression methods of estimation. Non-sampling errors, Non-response bias.

For sample questions and last year's questions, please visit
http://www.isical.ac.in/∼deanweb/JRFSTATSQ.html