MPAT-Statistics

(143)

Same may be continued for MPAT-2016-17

Department of Statistics
University of Rajasthan, Jaipur
Syllabus for University M. Phil. /Ph.D. Admission Test-2012
Duly Approved By
Department Research Committee (DRC)

2016-2017

UNIT I

(i) Probability Theory:

Classical and axiomatic definition of Probability, Sample space. Addition and Multiplication Theorem on Probability, Conditional Probability, Bayes Theorem, Random Variable-discrete and continuous. Distribution function, Probability distribution-Bernoulli, Uniform, Binomial, Poisson, Geometric, Rectangular, Exponential, Normal, Cauchy, Hyper-Geometric, Multinomial, Laplace, Negative Binomial, Beta, Gamma, Lognormal and Compound Poisson distribution, Joint Probability distributions, Conditional and Marginal distribution. Convergence distribution, in probability, with probability one and in mean square. Moments and Cumulants. Mathematical expectation and conditional expectation and Marginal expectation. Characteristics function, moment and probability generating functions.

(ii) Statistical Methods:

Collection, Compilation and Presentation of data, charts, diagrams and histogram. Frequency distribution. Measures of location, Dispersion, Skewness and Kurtosis, Bivariate and Multivariate data. Association and Contingency, Curve fitting Bivariate Normal Distribution, Correlation: Simple, Partial and Multiple, Regression- Linear and non-linear, Standard error and Large Sample Tests, Sampling distributions - t, Chi-square,F and Tests of Significance based on them.

(iii) Linear Models:

Theory of linear estimation, Gauss- Markoff setup. Least Square Estimators. Analysis of Variance, analysis of one way and two-way classified data-fixed.

UNIT II

(i) Estimation:

Characteristics of good estimator, estimation methods- maximum likelihood, minimum chi-square, moments and least square. Properties of Maximum Likelihood Estimators, Cramer-Rao inequality. Sufficient estimator, factorization theorem complete statistics rao-blackwell theorem confidence bounds.

(ii) Testing of Hypothesis:

Hypothesis Testing: Simple and Composite Hypothesis.Two kinds of error, critical region. Different types of critical regions and similar regions. Power function, Most powerful and uniformly most powerful tests. Neyman-Pearson Lemma. Likelihood Ratio test, Wald's SPRT, OC and ASN functions.

Prof. A.K. Saxena

Some may be considered for MPAT 2019 & 2020

11/4/21

Non-parametric Tests- Sign, Median, Wilcoxon, Mann-Whitney, Wolfowitz and Kolomogrov-Smirnov Rank order Statistic-minimum, Maximum, range and Median.

(iii) Multivariate Analysis:

Multivariate Normal distribution. Estimation of mean Vector and covariance matrix. Distribution of Hotelling-T^2 Statistics. Mahalanbis-D^2 Statistics and the use in testing. Partial and multiple correlation coefficients in samples from a multivariate normal population. Wishart's distribution and its reproductive and other properties.

(iv) Design of Experiments:

Principles of design of Experiment, layout and analysis of completely randomized, Randomized Block and Latin Square Designs. Factorial Experiments and Confounding in 2^n and 3^2 experiments. Analysis of Balanced and Partially Balanced Incomplete Block Designs. Analysis of covariance with one concomitant variable. Analysis of variance in case of single missing observation.

Unit III

(i) Sampling Techniques:

Census versus Sample survey. Pilot and large scale sample surveys. Simple random sampling with and without replacement. Stratified sampling and its sample allocations, cluster sampling, double, multistage ,systematic sampling and sampling with probability proportional to size. Non sampling errors. Ratio and regression methods of estimation.

(ii) Economic Statistics

Components of Time Series. Methods of their determination . Index numbers of prices and quantities and their relative merits, Construction of index numbers. Wholesale and Consumer Prices Index Numbers. Tests of adequacy an Index Numbers formula. Income-Distribution-Pareto and Engle curves. Concentration curves. Methods of Estimating National Income.

(iii)Statistical Quality Control

Statistical Quality Control: Control Charts for variables and attributes. Acceptance Sampling by attributes-Single, Double and Sequential Sampling plans, Concepts of AOQL and ATI. Acceptance Sampling by variables-use of Dodge-Romig and other tables.

(iv) Demography and Vital Statistics:

Different birth rates. Different Mortality Rates. Reproduction Rates. Internal and International migration: net migration. Stable and Stationary population. Life table and its construction and properties