

STATISTICS

PAPER I

(To set 10 Question, 5 from each half to attempt six questions, three from each half)

FIRST HALF

Probability : Event and sample space, Probability measure and probability space, Statistical and mathematical definition of probability, total and compound probability, conditional probability, independence of events in probability. Bay's theorem, random variables discrete and continuous, Repeated trials, expectation of sum and product of independent random variables, Tchebycheff's inequality, Weak law of large number Bernoulli theorem, Central limit theorem, standard probability, distributions binomial, normal, exponential, poisson, rectangular multinomial, geometric and hypergeometric, probability generating function, moment generating function and characteristic function.

Bivariate normal distribution, gamma, beta and power series, distributions, probability functions, marginal and conditional distributions, conditional mean and conditional variance.

Sampling distributions and Test of Significance :

Definition of sampling distribution and standard error, sampling distribution of sample mean drawn from a normal universe, sampling distribution of t , χ^2 and F . Statistics their properties and uses, s.e. of quantiles, multinomial proportion, s.e. of functions of statistics, uses of s.e. in large sample tests, Testing goodness of fit by Chi-square test, Test of independence of attributes, Kolmogorov test run test and sign tests.

SECOND HALF

Finite difference : Newton's forward and backward interpolation formulae, Lagrange's formula, Gauss, Bessel and Sterling's formula, divided difference formulae, numerical integration, general quadrature formula, trapezoidal Simpson's 1/3 rd and 3/0 th rules, Weddle's rule, Statistical methods and inference : Frequency curves measure of location and dispersion, skewness and kurtosis, Sheppard's correction for moments and cumulants, fitting of polynomial of least square method, orthogonal polynomial, correlation and regression analysis, involving two and three variables, rank, partial and multiple correlation and correlation coefficients and their tests of significance, correlation ratio test of linearity of regression.

Properties of estimates consistency, unbiasedness sufficiency and completeness, Minimum variance unbiased estimate, method of estimation by moments, maximum likelihood and minimum chi-square concept of interval estimation and confidence interval.

STATISTICS

PAPER II

FIRST HALF

Sample survey and decision of experiment :

Sample Versus census : Lies in sample survey, sampling methods, simple random sampling from finite population with and without replacement, stratified and systematic sampling, two stage and multistage sampling, pilot and multipurpose surveys, bias in estimates, standard error of estimate, estimation of population mean and total.

Principles of experimental design, one way and two way classifications, basic concept of AOV, CRD, RBD, and LSD -- their analysis, Missing plot technique in RBD, factorial experiment 22, 23 and 24, confounding, analysis of split plot experiment.

Time series and engineering statistics :

Additive and multiplicative models of time series, components of time series determination of trend by free-hand drawing moving average method & fitting of mathematical curves, measurement of seasonal and cyclical fluctuations, estimate of the variance of random components.

Concept of quality and meaning of control, Various control charts - \bar{x} R.C.P. and np, group control chart, single, double and sequential sampling plan, natural tolerance limits and specification limits, AQL, AOQL, OC and ASN functions.

SECOND HALF

Quantitative economics :

Definition, construction, interpretation and limitation of index number, type of index number, criteria of good index number, various problems in construction of index number, cost of living index number and its uses, wholesale price index number.

Theory and analysis of consumer demand, specification and estimation of demand function, supply function, elasticity of demand and supply, Engles curve and Engel's laws, Pareto law of income distribution, concentration curve, properties of least square estimators, analysis of variance in regression, test of significance of LS parameters.

Demography and Psychometry :

Source of demography data, definition and scope of demography, census and registration, NSS and other demographic data, Limitation of demographic data, Vital rates and ratios, construction and uses, life table complete and abridged, construction and uses of life table, estimation of migration, growth curve and projection, measure of fertility gross and net reproduction rates, standardisation and standardised rates.

Educational and psychological statistics, method of standardisation of scale and test, T.C. and percentile scale, IQ, reliability and validity of tests and T & Z scores.