20. Statistics

SYLLABUS
FOR
B.Sc./B.A. Pt-III

Subject: Statistics

Marks Scheme

		Marks	
Paper	**Nomenclature**	**Science**	**Arts**
Paper I	Sample Survey	50 mark	65 marks
Paper II	Design of Experiment and Computational Techniques	50 mark	65 marks
Paper III	**Practical based on Paper I,II**	50 mark	70 marks
	Total	150	200

Note:

In each Theory Question Papers , 10 (ten) questions will be set having 2 having 2(Two) from each unit. Candidates have questions in all, taking not more than one from each unit.

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Subject: Statistics

Paper –I
(Sample Surveys)

(Also common with Subject- Applied Statistics)

Unit-I

Concepts of population and sample, need for sampling, census & Sample surveys. Advantages of sample survey over complete enumerations, Principle steps in a sample survey, Principles of sample survey, Sampling and non-sampling errors.

Unit-II

Probability and non-probability sampling: Methods of drawing a random sample from finite population, accuracy and precision of an estimator. Simple random sampling with and without replacement, probability of selecting any specified unit in the sample ,simple random sampling of attributes, size of simple random sample for a specified precision.

Unit-III

Stratified random sampling: Meaning and advantages of Stratified Random Sampling, Estimation of the population mean and its variance. Optimum and proportional allocation and their comparison with SRS & SRS WOR.

Unit-IV

Systematic Sampling: Meaning and sample selection procedures, advantage and disadvantages, variance of the estimated mean, Comparison of systematic with (i) SRSWOR and (ii) stratified random sampling. Cluster sampling (of equal size): Meaning, advantages and disadvantages, estimation of population mean.

Unit-V

Ratio Method of estimation (first approximation only): Meaning, bias of ratio estimators, variance, efficiency of ratio estimate with SRSWOR estimate. Regression method of estimation (first approximation): Meaning, Simple Regression Estimate, expected value and variance of simple regression estimate. Comparison with SRSWOR and ratio estimators.

REFERENCES:

Des Raj(2000) : Sample Survey Theory. Narosa Publishing House.

Murthy, M.N.(1967): Sampling Theory and Methods. Statistical Publishing Society, Calcutta.

Singh, Daroga and Chaudhary. F.S.(1989): Theory and Analysis of Sample Surveys Designs. Wiley Eastern Ltd.

Sukhatme et al .(1984): Sampling Theory of Surveys with Applications. Indian Society of Agricultural Statistics.

Goon A.M, Gupta M.K. Das Gupta B (1986) , Fundamentals of Statistics, Vol II World Press Kolkata

Gupta S.C., Kapoor V.K : Fundamentals of Applied Statistics , Sultan Chand & Sons., New Delhi

ADDITIONAL REFERENCES:

Sampath S. (2000): Sampling Theory and Methods Narora Publishing House

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Paper II

Design Of Experiments and Computational Techniques

(Also common with Subject- Applied Statistics)

Unit-I

Analysis of Variance: Linear model & its different types (only introduction), Analysis of Variance technique, ANOVA for one-way and two-way classified data (with one observation per cell & fixed effects model) ; Least Square Estimates of Sum of squares, Effects of violations of basic assumptions of ANOVA; Transformations, Critical Difference.

Unit-II

Design of Experiments: Need for design of experiments, fundamental principles of design of experiments, Uniformity Trials, Choice of size and shape of plots , Basic designs (with one observation per cell & fixed effects model)-Completely randomized design(CRD), Randomised block design(RBD)- Their advantages and disadvatntages & usage. Efficiency of RBD over CRD.

Unit-III

Latin square design (LSD)- Analysis; least square estimates; expectation of sum of squares; efficiency of LSD over CRD & RBD, Missing plot technique- Estimation of single missing value in RBD & LSD . Factorial experiments-2^2 , 2^3 experiments, illustrations ,main effects, interaction effects & their analysis,.

Unit-IV

Computer Application and Data-Processing: Basics of Computer: Operations of a computer, Different units of a computer system like central processing unit, memory unit, arithmetic and logical unit, input unit, output unit etc. ,Hardware including different types of input, output and peripheral devices, Software, system and application software, number systems, Operating systems, packages and utilities, Low and High level languages, Compiler, Assembler, Memory– RAM, ROM, unit of computer memory (bits, bytes etc.).

Unit-V

Network - LAN, WAN, internet, intranet, basics of computer security, virus, antivirus, firewall, spyware, malware etc. Basics of Programming: Algorithm, Flowchart, Data, Information, Database, overview of different programming languages, frontend and backend of a project, variables, control structures, arrays and their usages, functions, modules, loops, conditional statements, exceptions, debugging and related concepts.

REFERENCES :

. Das M.N. & Giri N.C. (1986) .Design and Analysis of Experiments. Springer Verlag
. Goon A.M, Gupta M.K. Das Gupta B (1986) ; Fundamentals of Statistics. Vol-II World Press Kolkata
. Gupta S.C., Kapoor V.K. : Fundamentals of Applied Statistics . Sultan Chand & Sons., New Delhi
. Nagpal D.P. :Computer Fundamentals . Wheeler Publishing. New Delhi
Norton Peter : Peter Norton's Introduction of Computers . Tata McGraw hills
Stallings: Operating Systems PHI

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Kempthrone O. (1965) : The Design and Analysis of Experiments . Wiley Eastern
Cochran W.G. and Cox G.M. (1957) : Experimental Design . John Wiley and sons

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Paper III
Practical Paper

(Also Common with Subject- Applied Statistics)

1. To draw a SRS with and without replacement to obtain an estimate of the population total along with the estimates of their variances., Comparing the efficiency of SRSWR with SRSWOR .Finding of confidence interval for the population mean.

2. To draw all the possible samples by SRS-technique and that to show that expected value of the sample mean equals the population mean to show expected value, $E(S^2) = S^2$ in SRSWOR.

3. Stratified sampling (i) estimate the sample sizes by (a) proportional allocation (b) Neyman optimum allocation (ii) estimate the mean to the population under the above scheme(iii) calculation of the sampling variance (iv) Comparison of efficiencies of the allocation scheme amongst themselves as well as with SRS.

4. Systematic sampling
5. Cluster sampling.
6. Ratio & Regression methods of estimation.
7. Analysis of one way classification (CRD).
8. Analysis o two way classification (RBD).
9. Analysis of LSD.
10. Efficiency of RBD over CRD.
11. Efficiency of LSD over CRD & RBD.
12. Analysis of 2^2 & 2^3 factorial design.
13. Construction of Flowcharts and Algorithms for Statistical Problems

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