B.Sc./B.A. Part- II Examination 2024
STATISTICS

TEACHING AND EXAMINATIION SCHEME

Subject/Paper	Period/Week		Exam. Hours	Max Marks	Min.Pass Marks
STATISTICS	**L**	**P**			
Paper I	2	-	3	50	54
Paper II	2	-	3	50	
Paper III	2	-	3	50	
PRACTICALS	-	6	4	75	27

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Statistics

Paper I : Probability and Probability Distributions
Paper II : Correlation and Numerical Methods
Paper III: Sampling Techniques
Practical

Time- Three Hours **Maximum Marks – 50**

Paper - I

Probability and Probability Distributions

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C .

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – C: Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks.

Unit 1: Discrete probability distributions and their properties: Bernoulli, Binomial, Poisson, negative bionomial, geometric, hypergeometric, multinomial and discrete uniform distributions.

Unit 2: Continuous probability distributions and their properties: Uniform, Normal, Exponential, Beta type I and type II, Gamma and Cauchy distributions.

Unit 3: Distributions of functions of random variables, cumulative distribution, function techniques, distribution of sum, difference, product and quotient of two random variables, the moment generating functions and transformation techniques (Chapter V of Mood, Graybill and Boes Book).

Unit 4: Concepts of conditional expectations, the conditional variance, the joint moment generating function and moments, the bi-variate normal distribution and its properties.

Unit 5: Stochastic convergence: Chebyshev's inequality and its generalized form, weak and strong law of large numbers, simple form of central limit theorem.

BOOKS SUGGESTED:

Mood, A.M. , Graybill, F.A. and Boes, D.C. Introduction to the Theory of Statistics (Third edition), Mc-Graw-Hill.
Hogg, R.V. and Graig, A.T.: Mathematical Statistics, Amerind
Gupta, S.C. and Kapoor; V.K. ; Fundamentals of Mathematical Statistics, Sultan Chand and Sons, Delhi.

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Time- Three Hours **Maximum Marks – 50**

Paper II
Correlation and Numerical Methods

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C .

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – C: Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and 63answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks.

Unit 1: Method of least squares, its application in fitting of straightline, Second degree parabola, logarithmic and exponential curves. The bi-variate data marginal and conditional frequency distribution, covariance, variance of a linear function of variates.

Unit 2: Correlation and regression, the rank correlation, intraclass correlation, the correlation ratio, probable error.

Unit 3: Multivariate data, concept of multiple correlation and regression, partial correlations, multiple regression equation (for three variables).

Unit 4 : Time series and its components, method of moving average and curve fitting for determining trend, determination of seasonal indices. Link relative method.

Unit 5: Statistical applications of numerical methods: Methods of intra and extra polations due to Newton, Lagrange and Gauss. Divided differences and Newton's formula. Numerical Integrations: Trapezodial and Simpson's formulae.

BOOKS SUGGESTED

Gupta, S.C. and Kapoor, V.K. Fundamentals of Mathematical Statistics, Sultan Chand and Sons, Delhi.

Kapoor, J.N. and Saxena H.C.: Mathematical Statistics, S.Chand and Co., Delhi.

Scarborough, J.B.: Numerical Mathematical Analysis, Oxford and IBH.

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Time- Three Hours **Maximum Marks – 50**

Paper III

Sampling Techniques

Note: Each theory paper is divided in three parts i.e. Section – A, Section – B and Section – C .

Section A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited up to 30 words. Each question will carry 1 mark.

Section B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited up to 250 words. Each question will carry 3.5 marks.

Section – C: Will consist of total 05 questions one from each unit. The paper setter will set one question from each Unit and Students will answer any 03 questions and answer of each question shall be limited up to 500 words. Each question will carry 7.5 marks.

Unit 1: Sampling surveys vs. complete enumeration, random and purposive sampling. Methods of drawing random sample, the principal steps in sample surveys, sampling and non sampling errors.

Unit 2: Simple random sampling with and without replacement, stratified random sampling, comparison of stratified sampling with SRSWOR.

Unit 3: Ratio and regression methods of estimation, estimation of population mean and total in large sample size. Comparison with simple estimator.

Unit 4: Systematic Sampling: unbiased estimator, variance of the estimator (including in terms of intra class correlation coefficient), Comparison with SRS, elementary idea of estimation of variance". Cluster Sampling with equal cluster size: Unbiased estimator, variance of the estimator / (including in terms of intra class correlation coefficient), estimation of variance.

Unit 5: Two stages sampling in case of equal cluster size at both the stages. Two phase sampling: ratio and regression estimation.

BOOKS SUGGESTED

Cochran, W.G.: Sampling Technique, John Wiley Publication, New York.

Sukhatme, P.V. and others: Sample Surveys and its application, ISAS, Delhi – 12.

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PRACTICAL

The students will be asked to attempt three exercises out of five exercises. The distribution of marks will be as follows:

	Regular Students	Ex-Students
(a) Three Practical exercise	45 Marks	45 Marks
(b) Practical record work	10 Marks	-
(c) Viva-Voce	20 Marks	20 Marks
Total	75 Marks	65 Marks*

*To be converted out of 75 marks.

The following topics are prescribed for practical works:

1. Computation of co-efficient of (i) Simple correlation (ii) Rank correlation.
2. Preparation of correlation table from ungrouped data.
3. Determination of regression lines from (i) Ungrouped data (ii) Correlation table.
4. Fitting of linear regression in case of three variables, computation of partial and multiple correlations coefficient for three variables.
5. Fitting of (i) Straight line (ii) Second degree parabola (iii) Exponential curve by least square method.
6. Fitting of distributions (i) Binomial (ii) Poisson (iii) Normal distributions and testing of goodness of fit.
7. Moving average method for determining trend, seasonal indices.
8. Practical on Numerical methods (Covered in Paper II).
9. Practical on sampling techniques (Covered in Paper III).