20. STATISTICS, B.A.-II, 2021

Marks Scheme

Paper	Nomenclature	Marks	
		Science	Arts
Paper I	Statistical Inference	50 mark	65 marks
Paper II	Statistical Applications in Society and Industry	50 mark	65 marks
Paper III	Practical based on Paper I,II	50 mark	70 marks
	Total	150	200

Note: In each Question paper, 10 (ten) questions will be set having 2 (Two) from each unit. Candidates have to answer five questions in all, taking not more than one from each unit.

Paper I
(Statistical Inference)
Unit-I

Sampling from a distribution : Concept of statistic and its sampling distribution. Sampling distribution for mean of Binomial, Poisson and Normal Distribution. Chi-square Distribution: Definition, Derivation, Moments, M.G.F, C.G.F., Mode & Skewness Limiting and Additive Property. Distribution of ratio of Chi-square variates.

Testing Normal Population variance, Test for Goodness of fit, Contingency table & Independence of attributes. yate's correction 18 hours

Unit-II

t-Distribution Definition of Student's t & Fisher's t Statistic and derivations of their distributions, Constants, Limiting Property of 't' distribution. Applications-Testing of Single mean: Difference of two means: paired t test and sample correlation coefficient. F-Distribution : Definition, Derivation, Constants, Application- Testing of equality of two variances. Relationship between t, F and Chi-sqare Distributions. 18 hours

Unit-III

Theory of Estimation: Point Estimation-Concept and Problem for Point Estimation; Criterion of a good estimator (Unbisedness, Consistency, Efficiency, Sufficiency). MVUE. Method of moments Methods of Maximum Likelihood Interval Estimation-Concept, Confidence Interval, Confidence Coefficient; Construction of Confidence Interval for Population Mean, Variance; Difference of Population Means & Ratio of Variances of Normal Distributions. 18 hours

Unit-IV

Testing of Hypothesis: Simple, Composite, Null and Alternative Hypothesis. Types of error, Critical region BCR, Neyman-Pearson's Lemma for BCR. BCR in case of Binomial, Poisson, Normal and Exponential Population. 18 hours

Unit-V

Large sample tests Testing of single mean. proportion. Testing of difference of means and proportions. Non-Parametric Tests-Definition, Merits & Limitations. Sign test one sample and two sample cases. Run Test. Median test. 18 hours

REFERENCES:

1. Goon A.M. Gupta M.K., Das Gupta B. (1991). Fundamentals of Statistics, Vol.1, world Press, Calcutta
2. Hodges J.L. and Lehman E.L. (1964). Basic Concepts of Probability and Statistics, Holden Day.
3. Mood A.M., Graybill F.A. and Boes D.C. (1974). Introduction to the Theory of Statistics, McGraw Hill.
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Freund J E. (2001): Mathematical Statistics, Prentice Hall of India.

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

ADDITIONAL REFERENCES:

1. Bhatt B.R. Srivenkatramana T and Rao Mahhava K.S. (1997): Statistics A Beginner's Test. Vol.II New Age International (P) Ltd.

2. Rohatgi V K (1967): An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.

3. Snedecor G.W. and Cochran W.G. (1967): Statistical Methods: Iowa State University Press.

4. E.J. Dudewicz & S.N. Misra: Modern Mathematical Statistics John Wiley and Sons.

Subject : Statistics Paper II
(SATISTICAL APPLICATIONS IN SOCIETY AND INDUSTRY

(Also Common with Subject: Applied Statistics)

Unit-I

Demographic Methods: Sources of demographic data-census, register, adhoc survey, hospital records, demographic profiles of Indian census. Measurement of mortality-Crude death rates, Infant mortality rates, Death rate by cause, Standardized death. rate, Complete life table-Construction and its main features, Mortality rate and probability of dying. Relation between different columns of life table uses of life table and its limitations. Measurement of fertility: Crude birth rate. General fertility rate, Specific fertility rate, Total fertility rate. Gross reproduction rate, Net Reproduction Rate,

18 hours

Unit-II

Economic Statistics: Index numbers-Defination. Applications of index numbers, Price relatives, Quantity & Value relatives, Link and Chain Relatives. Problems involved in computation of index number, Use of averages, Simple aggregative and Weighted average methods Laspeyre's Paasche's and Fisher's index number, Tests for index numbers. Consumer price index. 18 hours

Unit-III

Time Series Analysis: Definition its differents components, illus-

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...rations. additive and multiplicative models Different Methods for determination of trend & seasonal fluctuation alongwith their merits & demerits   18 hours

Unit-IV

Educational Statistics: Methods of standardization of scales and tests. Z-scores. t-scores Standard scores. Percentile score, Intelligence Quotient and its measurement and uses.' validity of test scores reliability of scores and their determination.   18 hours

Unit-V

Statistical Quality Control: Concept of SQC, Process control & Product control. Causes of variation in quality. General theory of control charts. control limits, sub-grouping, Summary of out-of control criteria. Control charts for variables: Construction of Mean and Range charts Concept of Defects and Defectives. Control Charts for attributes: Construction of np-chart, p-chart, c-chart and their merits and demerits.   18 hours

REFERENCES:

1. Croxton F.E. Cowden D.J. (1969): Applied General Statistics, Prentice Hall of India.
2. Duncan A.J. (1974): Quality Control and Industrial Statistics, Taraporewala and Sons.
3. Goon A.M. Gupta M.K. Das Gupta. B. (1986): Fundamentals of Statistics: Vol.II World Press. Calcutta.
4. Grant E.L. (1964): Statistical Quality Control. Mc Graw Hill.
5. Guilford J.P. & Fruchter B. Fundamental Statistics in Psychology and Education (1980). Mc Graw Hill.
6. Guilford J.P. (1954): Psychometric Method. Mc Graw Hill.
7. Srivataya O.S. (1983): A Textbook of Demography, Vikas Publishing.
8. S.C. Gupta & V.K. Kapoor: Fundamentals of Applied Statistics. Sultan Chand and Sons., New Delhi.

ADDITIONAL REFERENCES:

1. Freeman Frank S. (1962): Psychological Testing, Oxford & IBH Publishing Co.
2. Gupta and Mukhopadhyay P.P.: Applied Statistics. Central Book Agency.
3. Pressat R (1978): Statistical Demography: Methuen and Co

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Subject : Statistics Paper III
Practical Paper

1. Tests of significance based on t, Chi-square, F. Testing of significance of sample correlation coefficient, use of Z transformation.

2. Large sample tests for means and proportions. Tests of goodness of fit and independence of attributes in contingency tables.

3. Non parametric tests: Sign, Run, Median (for large samples)

4. Computation of mortality and fertility rates. Construction of life table.

5. Construction of Index Numbers by Laspeyre's, Paasche's, Fisher's, Chain Base Indices. Consumer price index.

6. Tests for Index numbers.

7. Determination of trend in a time series and construction of seasonal indices.

8. Drawing of X, R, np, p and C-Charts.