STATISTICS

CLASS - XI

One Paper ***Time : 3 Hours*** ***100 Marks***

Unit No.	Contents	Marks
1.	Mathematical Preliminaries	20
2.	Descriptive Statistics	20
3.	Correlation and Regression	15
4.	Index Number	20
5.	Method of Least Squares with curve fitting and Time Series	15
6.	Sample Survey	10

Unit No.	Contents	Marks	Periods
1.	**Mathematical Preliminaries :** Theory of set, set operation (union and intersection), complement of set, difference of sets, commutative laws, associative laws, distributive laws, complementary laws, De-Morgan's laws, Venn diagram, conepts of permutations and combinations (basic concepts only), meaning of ${}^{n}p_{r}$ or P (n,r) and ${}^{n}c_{r}$ or c (n,r) and their applications. Binomial Theorem with positive integral index, Definition of Logarithm, laws of Logarithms and change of base, Exponential series, concept of function and limit, Differentiation, Partial differentiation involving two (2) variables, Maxima and Minima, concept of Intergration and its Theorems, Fundamental theorem of Integral calculus (statement only).	20	30
2.	**Descriptive Statistics :** Measures of Central tendency–Mean, Median and Mode, Partition values, Measures of Dispersion-absolute dispersion (range, quartile duration, mean deviation, standard deviation), relative dispersion (co-efficient of quartile deviation, co-efficient of mean deviation, co-efficient of variation); Measures of Skewness and Kurtosis; Moments-raw and central moments and their relation.	20	20
3.	**Correlation and regression :** Bivariate distribution, Meaning of correlation, Scatter diagram, Correlation co-efficient due to Karl Pearson, Invariant property, Derivation of limits of correlation co-efficient, Lines of regression, regression co-efficient, Identification of regression lines from two given regression equation, Relation between the correlation co-efficient and regression co-efficients.	15	20

Unit No.	Contents	Marks	Periods
4.	**Index Number :** Meaning of index number and their uses, Problems in the construction of index number, Lasperyre's Paasche's and Fisher's index number, Time reversal and Factor reversal Tests for the consistency of an index number, chain index number, construction of cost of living index number and its uses.	20	35
5.	**Method of Least Squares with curve fitting and Time Series.** Method of Least Squares, Normal equations, Curve fitting by the principles of Least Squares (straight lines and exponential curves) Times series and its components, models of time series, uses of time series, Measurement of trend by : (i) graphic method, (ii) Semi-average and Moving average method, (iii) method of least squares; short time fluctuations.	15	20
6.	**Sample Survey :** Concept of Sample Survey, Population, Sample, Parameter, statistic, steps and basic principles in Sample Survey, Advantages of Sample Survey over complete enumerations sampling and non-sampling errors, Random number tables, Drawing of sample using random number tables, simple random simpling with and without replacement, variance of the sample mean of SRSWR and SRSWor and their standard errors (without derivation).	10	15

PRESCRIBED TEXTBOOKS :

1. Set Theory and related topics for Class XI
   By : S.C. Gupta [Krishna Prakash Media (P) Ltd., II Shivaji Road, Meerut-1 (U.P.)]
2. Textbook on Differential Calculus
   By : Gorakh Prasad [For Partial Differentiation] Pothishale Private Limited.
   2. Lajpat Road, Allahabad - U.P.]
3. A Textbook of Plus two Mathematics for Class XI
   By : Sajal Kanti Chakrabarty Biswajit Bhagawati [S. Chand & Co. Ltd.]
4. A Text Book of Mathematics for Class XII Part I (Calculus) [For Integral Calculus]
   By : P.L. Singh [S.I. & Co., Imphal]
5. Fundamental of Mathematical Statistics
   By : S.C. Gupta and V.K. Kapoor [Shultan Chand & Sons]
6. Fundamental of Applied Statistics
   By : S.C. Gupta and V.K. Kapoor [Shultan Chand & Sons]

DESIGN OF QUESTION PAPER

Subject : **STATISTICS**
Class : XI
Full Mark : 100
Time : 3 Hours

I

WEIGHTAGE TO OBJECTIVES:

Objectives	Marks	Percentage
Knowledge(K)	15	15
Understanding (U)	51	51
Application (A)	30	30
Skill (S)	04	04
Total :	**100**	**100**

II

WEIGHTAGE TO FORMS OF QUESTIONS:

FORM OF QUESTIONS	No. of questions	Time(in minutes)	Marks	Percentage
Essay/Long Ans: (E/LA)	6	65	36	36
Short Answer (SA-I)	5	36	20	20
Short Answer (SA-II)	4	22	12	12
Short Answer (SA-III)	6	22	12	12
Very Short Answer(VSA)	8	14	8	8
MCQ	12	21	12	12
Total:	**41**	**180**	**100**	**100**

III

WEIGHTAGE TO CONTENT:

Unit	CONTENTS :	Marks	Percentage
1	Mathematical Preliminaries	20	20
2	Descriptive statistics	20	20
3	Correlation and Regression	15	15
4	Index Number	20	20
5	Method of Least Squares with curve fitting and Time Series	15	15
6	Sample Survey	10	10
	Total:	**100**	**100**

IV **SCHEME OF SECTIONS : NIL**

V **SCHEME OF OPTIONS : Internal option in two SA-I (including case study question), two in SA-II, one in SA-III and three in E/LA**

VI **DIFFICULTY LEVEL :**

Difficult : 30% of the total marks
Average : 50% of the total marks
Easy : 20% of the total marks

Special Instruction: 1) Two questions of MCQ will be Assertion-Reason type question.
2) One question of SA-I will be case study question
3) First option will be (a) & second option will be (b) in the internal option

Abbreviation : K(Knowledge),U(Understanding),C(Comprehension), Exp.(Expression), Skill(S), E(Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)

STATISTICS

CLASS - XII

One Paper ***Time : 3 Hours*** ***100 Marks***

Unit	Contents	Marks
1.	Probability and Expectation	20
2.	(i) Finite difference and Interpolation.	15
	(ii) Numerical Integration	10
3.	Standard Distributions.	10
4.	Theory of Attributes.	15
5.	Theory of Estimation and Testing of Hypothesis	15
6.	Vital Statistics.	15

Unit	Contents	Marks	Periods
1.	**Probability and Expectations :** Random Experiment, Trial, Event, Equally likely events, Mutually exclusive events, Favourable events and Exhaustive events, Independent and dependent events, Simple and Compound events. Sample space, Mathematical and Statistical definitions of probability, conditional probability, Additive and multiplicative laws of probability, Random Variable. Expectation of discrete random variable. Theorems on expectation of Sum and product of two discrete random variables.	20	30
2.	**(i) Finite difference and Interpolation :** Delta (Δ) and E operators, their relation and properties, Construction of forward and backward difference tables. Rational integral function, Derivation of Newton's forward, Newton's backward and Langrange's interpolation formulae with related examples, advantages and disadvantages of the above formulae.	15	20
	(ii) Numerical Integration : Meaning of numerical integration and its advantages over definite integral. Derivation of General Quatrature Formula. Deductions of Trapezoidal's rule, Simpson's $\frac{1}{3}$ rd rule and $\frac{3}{8}$ rd rule with related examples.	10	15

Unit	Contents	Marks	Periods
3.	**Standard distributions :** Bernoulli trial, Derivation of Binomial and Poisson distribution and their means and variances. Normal distribution, its importance and some basic properties (without derivation).	10	15
4.	**Theory of Attributes :** Concept of attribute, positive and negative classes, order of classes, number of classes, class frequencies upto 3 (three) attributes, independence, association and consistency of attributes. Yule's coefficient of association and Contigency table.	15	20
5.	**Theory of Estimation and Testing of Hypothesis :** Concept of estimation, biased and unbiased estimators, simple and composite hypothesis, Null hypothesis, Alternative hypothesis. Critical and non-critical regions. Concept of type I and type II errors, Level of significance, concept of degrees of freedom. Test of significance for small sample based on student's t, Fisher's t X^2 (chi square) and F.	15	25
6.	**Vital Statistics :** Meaning of Vital Statistics and its uses. Methods of obtaining Vital Statistics. Measurement of Mortality Rates–CDR, SPDR and STDR. Measurement of fertility and reproductive rates–CBR, GRR, TFR and NRR, construction of complete life-table.	15	25

PRESCRIBED TEXTBOOKS :

1. Fundamental of Mathematical Statistics
   By : S.C. Gupta and V.K. Kapoor (Shultan Chand & Sons)
2. Fundamental of Applied Statistics
   By : S.C. Gupta and V.K. Kapoor (Shultan Chand & Sons)
3. Calculus of Finite Difference
   By : H.C. Saxena (S. Chand & Co. Ltd.)

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FOR THE ACADEMIC SESSION 2024-25

DESIGN OF QUESTION PAPER

Subject : **STATISTICS**
Paper : Theory
Class : XII
Full Mark : 100
Time : 3 Hours

I	**WEIGHTAGE TO OBJECTIVES:**				
	Objectives			Marks	Percentage
	Knowledge(K)			20	20
	Understanding (U)			46	46
	Application (A)			30	30
	Skill (S)			4	4
	Total:			**100**	**100**
II	**WEIGHTAGE TO FORMS OF QUESTIONS:**				
	FORM OF QUESTIONS	No. of questions	Time(in minutes)	Marks	Percentage
	Essay/Long Ans: (E/LA)	6	65	36	36
	Short Answer (SA-I)	7	51	28	28
	Short Answer (SA-II)	8	28	16	16
	Very Short Answer(VSA)	10	18	10	10
	MCQ	10	18	10	10
	Total:	**41**	**180**	**100**	**100**
III	**WEIGHTAGE TO CONTENT:**				
	Unit	**CONTENTS :**		Marks	Percentage
	1	Probability and Expectation		20	20
	2	(i) Finite difference and Interpolation		15	15
		(ii) Numerical Integration		10	10
	3	Standard Distributions		10	10
	4	Theory of Attributes		15	15
	5	Theory of Estimation and Testing of Hypothesis		15	15
	6	Vital Statistics		15	15
		Total:		**100**	**100**
IV	**SCHEME OF SECTIONS : NIL**				
V	**SCHEME OF OPTIONS : Internal option in any five SA-I Type and in any Four Essay Type.**				
VI	**DIFFICULTY LEVEL :** Difficult : 30% Average : 50% Easy : 20%				

Abbreviation: K(Knowledge), U(Understanding), A(Application),S(Skill), E(Essay Type), SA(Short Answer Type), VSA(Very Short Answer Type), O(Objective Type), MCQ (Multiple Choice Question).

FROM THE ACADEMIC SESSION 2025-26

DESIGN OF QUESTION PAPER

Subject : **STATISTICS**
Class : XII
Full Mark : 100
Time : 3 Hours

I

WEIGHTAGE TO OBJECTIVES:

Objectives	Marks	Percentage
Knowledge(K)	15	15
Understanding (U)	51	51
Application (A)	30	30
Skill (S)	04	04
Total :	**100**	**100**

II

WEIGHTAGE TO FORMS OF QUESTIONS:

FORM OF QUESTIONS	No. of questions	Time (in minutes)	Marks	Percentage
Essay/Long Answer (E/LA)	6	65	36	36
Short Answer (SA-I)	5	36	20	20
Short Answer (SA-II)	4	22	12	12
Short Answer (SA-III)	6	22	12	12
Very Short Answer(VSA)	8	14	8	8
MCQ	12	21	12	12
Total:	**41**	**180**	**100**	**100**

WEIGHTAGE TO CONTENT:

Unit	CONTENTS :	Marks	Percentage
1	Probability and Expectation	20	20
2	(i) Finite difference and Interpolation	15	15
	(ii) Numerical Integration	10	10
3	Standard Distributions	10	10
4	Theory of Attributes	15	15
5	Theory of Estimation and Testing of Hypothesis	15	15
6	Vital Statistics	15	15
	Total:	**100**	**100**

IV **SCHEME OF SECTIONS : NIL**

V **SCHEME OF OPTIONS : Internal option in two SA-I (including case study question), two in SA-II, one in SA-III and three in E/LA**

VI **DIFFICULTY LEVEL :**

Difficult : 30% of the total marks
Average : 50% of the total marks
Easy : 20% of the total marks

Special Instruction: 1) Two questions of MCQ will be Assertion-Reason type question.
2) One question of SA-I will be case study question
3) First option will be (a) & second option will be (b) in the internal option

Abbreviation : K(Knowledge),U(Understanding),C(Comprehension), Exp.(Expression), Skill(S), E(Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)