

## STATISTICS

Class:12th

MaximumMarks:100

(Theory:70,Practical:30)

Time : 3Hrs

(Internal=10; External =20)

### **Unit I: Probability-I**

**(07marks)**

Random Experiment, Trail, Sample space, Sample point, Events, Impossible event, Exhaustive events, Equally like and mutually exclusive events, Independent & Dependent events. Definitions of Probability, Classical and Mathematical. Axioms of Probability. Law of Addition for two events. Law of Multiplication of two events. Concept of conditional probability, Statement of Baye's theorem.

### **Unit II:Probability-II**

**(08marks)**

Random variable, Types of random variable (Discrete and Continuous), Distribution functions, Types of Distribution functions (Discrete and Continuous), Probability Mass Function, Probability Distribution Function, Numerical characteristics of random variable (Discrete and Continuous), Definition of some Discrete probability distributions (Bernoulli, Binomial and Poisson Distributions) and applications in real life, Evaluate first two moments of Discrete Probability Distributions.

### **Unit III:Regression Analysis**

**(08marks)**

Concept of Bi-variate data, Graphical representation of Bi-variate data, Scattered diagram, Concept of Regression, Paired linear regression (Regression lines), Estimation of parameters (Least square method), Estimation of unknown observations, Regression Coefficients, Properties of regression coefficient, Fitting of regression lines to real life data, Application of regression analysis, Angle between two regression lines.

### **Unit IV: Theory of Attributes**

**(08marks)**

Concept of attributes, categories of attributes (Dichotomy, many-folds), Notations used in theory of attributes, Class frequencies, order of class frequencies, ultimate class frequency, consistence of data, (2X2) contingency table for attributes, Independence and association between two attributes, Yule's coefficient of association, use of Yule's coefficient of association in real life data.

### **Unit V: Index Number**

**(08marks)**

Basic information of Index Number, Characteristics of Index Number, Applications of index number, Problems in the construction of Index Number. Important terms used in index number ( Base year price/quantities, current year price quantities, price relative, price index, quality index), Methods of constructing index number, Simple or un-weighted index number, limitation of simple index number, Simple average of price relatives. Weighted Index Number, Methods of calculating weighted index number (Laspeyer's, Paasche's and Fisher's index number), Time Reversal Test (TRT) and Factor Reversal Test (FRT), Testing for ideal index number.

## Unit VI: Vital Statistics

(07marks)

Meaning and nature of Vital Statistics, Uses of Vital statistics, Various terms used in vital statistics ( Vital Events, Population, Mean Population), Concept of Fertility and Mortality, Different measures of fertility (Crude Birth Rate, Specific Birth Rate, General Fertility Rate, Specific Fertility Rate, Gross Reproduction Rate), Different measures of mortality (Crude Death Rate, Specific Death Rate, Standardized Death Rate).

## Unit VII: Sampling Theory

(08marks)

Meaning and Objective of sampling, Concept of Statistical Population and Sample (WR, WOR), Homogenous and Heterogeneous population, Requisites of good sample, Sampling and Census, advantages and disadvantages of sampling over census, different sampling techniques (Simple Random Sampling, Stratified sampling and systematic sampling), Sampling and non-sampling errors, Advantages and disadvantages of different sampling methods, Application of different sampling methods in real life situations.

## Unit VIII: Time Series Analysis

(07marks)

Introduction and Importance of Time Series, Examples of time series, Components of Time Series (Secular, Seasonal, Cyclic, Irregular trends), Graphical presentation of time series data, Measure of trend by using various techniques (Freehand method, Semi average method), Estimation of unknown values from given time series data, Forecasting by time series.

## Unit IX: Linear Programming and Computer Applications-II

(09 marks)

Concept of Linear programming, Feasible solution, Basic feasible solution, Two dimensional Linear programming problems, Graphical method to solve two dimensional Linear programming problems (Maximization/Minimization models).

Concept of software and hardware, System software and application software, Concept of Software used in statistical analysis (Microsoft Excel, Minitab, SPSS), Applications of Statistical software.

## Practical/Projectwork

1. Fitting of Binomial and Poisson distribution.
2. Construct regression lines to real life data and estimate unknown values
3. Construction of Index number (Laspyer's, Paasche's and Fisher's), using market data.
4. Testing of ideal index number using data collected by students.
5. Estimation of different measures of fertility and mortality.
6. Forecasting of time series data using free hand method and semi-average method.
7. Calculation of sample mean and population mean from collected data and check  $E(\text{sample mean}) = \mu$
8. Construct different statistical charts by using statistical software.
9. Calculation of measures of central tendency and measures of dispersion by using statistical software.
10. Construct a linear programming problem and solve it by graphical method.