1) What is Statistics?

Ans: Statistics is a numerical description of some events or subjects. Secondly, it is a method of analysis and interpretation of data. However, statistics usually refers to techniques and methods.

That is, Statistics is a branch of knowledge which includes appropriate method of collection of data on certain problem, its presentation and analysis, and finding out the truth from the results of the analysis.

According to Prof A.L. Bowley, "Statistics is a science of measurement of social organism regarded as a whole in all its manifestation."

Webster defined statistic as, "The classified facts relating to the condition of the people in a state especially those facts which can be stated in numbers or in any tabular or classified arrangement."

Webster's definition is limited only in the information on the general conditions of the people of a state; it does not include information on the other branches of knowledge.

Therefore, Statistics can be defined as a branch of science which deals with collection, organization, presentation and analysis of numerical data and drawing.

The different functions of statistics are:

- Collection of data.
- Organization of data.
- Presentation of data.
- Analysis of data.
- Interpretation and drawing inference.

Characteristic Features of Statistics:

Some of the characteristic features of the science of statistics are stated below:

1. Statistics deals with aggregate of individuals rather than with individuals. Per capita income of a country is a statistical information because it is an information about the population.
2. Statistics deals with variation.
3. Statistics deals with only numerically specified populations.
4. Statistical inferences are drawn with the probability of uncertainty.
5. The logic used in statistical inference is inductive.

Uses of Statistics:

Statistics is such a science, application of which is inevitable in all spheres of life. Statistics has wide application in solution of problems related to Economics, Social Science, Biological Science, Agricultural Science, Business, Planning, Education and Research.

There is no branch of knowledge whose data analysis does not require statistical techniques. Application of statistics in some important fields are briefly discussed in this section.

(i) Statistics in Agriculture:

(ii) Statistics in Economics

(iii) Statistics in Planning:

(iv) Statistics in Biology:

(v) Statistics in Trade and Commerce:

Limitations of Statistics:

In spite of popular uses of statistical methods in different areas of knowledge, there are some limitations of statistics too. The limitations are discussed below:

- Statistics does not refer to the characteristics of any individual, rather it analyses the collected data and refers to the overall results.
- Statistical results are true on the average, for particular case it may not be true.
- Statistics usually collects data through sample survey and comments on the population characteristics on the basis of sample information. Such sample based comments may not be true in some cases.

Variables:

Measurable characteristics of a population that may vary from element to element either in magnitude or in any quality are called variables.

Variables are of two types:

1) Quantitative variable: Variable characteristics, whose values are expressed numerically, are known as quantitative variables. For example- height or weight of students, weight of tomato, length of fishes etc.

Quantitative variables are of two types- Continuous and Discrete.

2) Qualitative Variable: Some variables, which express the quality of population elements, cannot be numerically measured but can be classified or categorized, these are called qualitative variables. For example- merit of students, types of farmers etc.

Frequency:

In many situations numerical values of population characteristics may often repeated again and again. Such repetition of the value of variable is called frequency. For example, several number of fishes may have same length and weight.

Frequency Distribution:

Information collected in any process are usually classified or grouped according to specific characteristics. Arrangement of observational data according to frequencies of the observations is called frequency distribution.

Construction of frequency distribution:

- Finding the range:
  Range (R)= Highest value-Lowest Value.

- Decision about the number of classes:
  $k=1+3.3222 \log_{10} N$; (where N is the total number of observations in the data set and k is the desired number of classes.)

- Choosing the class interval:
  $$\text{Class Interval (C)} = \frac{\text{Range (R)}}{\text{No. of classes (k)}}$$