What is sampling? Explain the principal steps involved in conducting a sample survey.

(2 + 8 = 10 marks)

Sampling is a statistical method of selecting a small group of individuals, households, firms, or observations (called a *sample*) from a larger group (called the *population*) in order to study and draw conclusions about the whole population.

The following are the major steps involved in conducting a sample survey:

(i) Defining the Objective of the Study: The first step is to clearly state the purpose of the survey. The researcher must know what information is required and why.

(ii) Defining the Population (Universe): The population or universe refers to the entire group about which information is required. It may consist of individuals, households, firms, or any other unit. The population must be clearly defined in terms of area, time, and characteristics.

(iii) Determining the Sampling Frame: A sampling frame is a complete list of all the units in the population from which the sample will be selected.

(iv) Choosing the Sampling Method: The researcher must decide the method of sampling. It may be either probability sampling or non-probability sampling. The choice depends on the nature and objective of the study.

(v) Determining the Sample Size: The size of the sample must be decided carefully. A larger sample generally gives more reliable results, but it also increases cost and time. Therefore, a balance must be maintained.

(vi) Selecting the Sample: After deciding the method and size, the actual sample units are selected according to the chosen technique.

(vii) Collection of Data: Data are collected from the selected sample units using questionnaires, interviews, observation, or other methods.

(viii) Analysis and Interpretation: Finally, the collected data are classified, tabulated, analyzed, and interpreted to draw conclusions about the population.

What are the different types of sampling? Explain in detail. (10 Marks)

Sampling methods are broadly divided into two major categories: probability sampling and non-probability sampling. The classification is based on whether each unit of the population has a known chance of being selected. In economic research and statistical analysis, the choice of sampling method is crucial to the reliability and validity of the results.

1) Probability sampling: It is a scientific method in which every unit of the population has a definite and known probability of being selected. Because of this feature, probability sampling allows the application of statistical tools for estimation and hypothesis testing. The following are different probability sampling methods:

i) Simple random sampling: One of the simplest forms is simple random sampling. In this method, each unit of the population has an equal chance of selection. The selection may be done through a lottery method, random number tables, or computer-generated random numbers. This method is free from personal bias and easy to understand. However, it requires a complete and accurate sampling frame.

ii) Stratified sampling: In this method, the entire population is divided into different homogeneous groups called strata based on characteristics such as income level, gender, occupation, region, or education. After dividing the population into strata, samples are drawn from each stratum either proportionately or equally. This method ensures representation of all important subgroups and increases the precision of estimates. Stratified sampling is especially useful when the population is heterogeneous.

iii) Systematic sampling: It is another probability method in which every k^{th} unit is selected from an ordered list after choosing a random starting point. For example, if a sample of 100 is required from a population of 1,000, every 10^{th} unit may be selected. This method is simple, less time-consuming, and suitable for large populations.

iv) Cluster sampling: It is generally used when the population is geographically scattered. Instead of selecting individuals directly, the population is divided into clusters such as villages, blocks, schools, or districts. A few clusters are randomly selected, and then all or some units within those clusters are studied. This method reduces costs and travel time, making it suitable for large-scale

surveys such as national sample surveys. However, if clusters are not internally homogeneous, the results may be less accurate.

v) Multistage sampling: This method is an advanced form of cluster sampling where sampling is done in stages. For example, in a national survey, states may be selected first, then districts, then villages, and finally households. This method is flexible and widely used in large government surveys because it is economical and practical.

2) Non-probability sampling: In contrast, non-probability sampling refers to methods where the probability of selection of each unit is not known. These methods are generally used when time, cost, or availability of the sampling frame is a constraint. Although they are less scientific, they are useful in exploratory research. Convenience sampling involves selecting units that are easily available to the researcher. It is simple and inexpensive but may suffer from serious bias, as it may not represent the whole population.

The following are different types of non-probability methods:

i) Judgment or purposive sampling: It is based on the researcher's experience and knowledge. The researcher selects the units considered most appropriate for the study. This method is often used in qualitative research or case studies.

ii) Quota sampling: It is somewhat similar to stratified sampling, but the selection within each group is not random. The population is divided into categories, and a fixed quota is assigned to each category. The investigator then selects respondents conveniently until the quota is filled. It is commonly used in market research.

iii) Snowball sampling: It is another non-probability method used when the population is difficult to identify, such as migrant workers or informal sector participants. In this method, existing respondents help to identify other respondents.

In conclusion, probability sampling methods are more reliable and suitable for quantitative economic research because they reduce bias and allow statistical inference. Non-probability methods are useful for exploratory or preliminary studies but may lack representativeness. Therefore, the selection of an appropriate sampling method depends on the nature, objectives, and scope of the research study.