**Research methodlogy and ipr**

1. **Write at least 2 definitions of research.**

* Research refers to a search for knowledge.
*  It is a scientific and systematic search for pertinent information on a specific topic.
*  It is an art of scientific investigation.
*  It is obtaining the knowledge of whatever unknown through inquisitiveness.
*  It is a systematic method of enunciating the problem, formulating hypothesis

**2. List out the objectives of the research.**

OBJECTIVES OF RESEARCH:

The purpose of research is to discover answers to questions through the application of

scientific procedures.

i) To gain familiarity with a phenomenon or to achieve new insights into it (exploratory

research).

ii) To portray the characteristics of an individual, or a group or a situation (descriptive

research).

iii) To determine the frequency with which something occurs (descriptive research).

iv) To test the hypothesis of a casual relationship between variables (hypothesis- testing).

**3. What are the types of research? Elaborate on each one of them.**

**1. Descriptive versus Analytical:**

*  Descriptive research includes surveys and fact-finding enquiries of different kinds.
*  It describes the state of affairs as it exists at present.
*  The researcher has no control over the variables and reports only what has happene or is happening.
*  For example, frequency of shopping, preference of people.
*  In analytical research, the researcher has to use facts or information already available and analyse these to make a critical evaluation of the material.

2. **Applied versus Fundamental:**

*  Applied research aims at finding a solution for an immediate problem facing a society

or an industrial/ business organisation.

*  Fundamental research is gathering knowledge for knowledge sake.
*  For example, research related to pure mathematics.

**3. Quantitative versus Qualitative:**

*  Quantitative research is based on the quantitative measurements of some

characteristics and is applicable to phenomena that can be expressed in terms o

*  Qualitative research is concerned with phenomena relating to or involving quality or kind.
*  For example, investigating the reasons for human behaviour.

**Conceptual versus Empirical:**

 Conceptual research is that related to some abstract ideas or theory and is generally

used by philosophers and thinkers to develop new concepts or to reinterpret existing

ones.

 Empirical research relies on experience or observation alone, often without due

regard for system and theory.

 It is also called empirical research, it is data based, coming up with conclusions which

are capable of being verified by observation or experiments.

**5. Some other types:**

a) One-time research which is confined to a single time-period and longitudinal

research which is carried over several time periods.

b) Field setting research, laboratory research and simulation research, depending upon

the environment in which it is to be carried out.

c) Clinical research and diagnostic research which follow case study methods.

d) Exploratory research which deals with only development of hypotheses and

formalised research which deals with testing of hypotheses.

e) Historical research which utilises historical sources like documents to study events or

ideas of the past.

f) Conclusion oriented and decision oriented

**4. With the help of a neat diagram, explain the research process in detail.**

**RESEARCH PROCESS:**

**1. Formulating the research problem:**

 There are two types of research problems- those which relate to the states of nature

and those which relate to relationships between variables.

 Formulating a research problem involves understanding the problem thoroughly and

rephrasing the same into meaningful terms from an analytical point of view.

 Understanding the problem can be done by discussing with people having some

expertise in the matter.

 The problem is put in general terms and then phrased in operational terms.

 The researcher must get acquainted with the selected problem by examining all

available literature.

 There are two types of literature- the conceptual literature concerning the concepts

and theories, and the empirical literature consisting of studies made earlier which are

similar to the one proposed.

 The basic outcome of this review will be the knowledge as to what data and other

materials are available for operational purposes which will enable the researcher to

specify his own research problem in a meaningful context.

**2. Extensive literature survey**:

 A brief summary of the problem should be written down.

 An extensive literature survey should be undertaken by referring to journals,

conference proceedings, government reports, books, etc.

 Earlier studies of similar nature if any, should be carefully studied.

**3. Development of working hypothesis**:

 The working hypothesis has to be clearly stated.

 A working hypothesis is a tentative assumption made in order to draw out and test its logical or empirical consequences.

 Hypotheses provide the focal point for research.

 They affect the manner in which the tests must be conducted in the analysis of data

 A hypothesis should be very specific and limited to the piece of research in hand.

 A hypothesis guides the researcher, sharpens his thinking and also indicates the type

of data required and the type of methods of data analysis to be used.

 The working hypothesis can be developed by:

(a) Discussions with experts about the problem, its origin and the objective in seeking

a solution.

(b) Examination of data and records concerning the problem for possible trends and

pecularities.

(c) Review of similar studies in the area or of the studies on similar problems.

(d) Exploratory personal investigation.

**4. Preparing the research design:**

 The researcher has to state the conceptual structure within which the research would be conducted.

 The function of research design is to provide for the collection of relevant evidence

with optimum effort, time and expenditure.

 The preparation of research design involves the following considerations:

(a) The means of obtaining the information.

(b) The availability and skills of the researcher

(c) Explanation for organising the selected means of obtaining information.

(d) The time available for research.

(e) The cost factor relating to research.

**5. Determining sample design:**

 All the items under consideration in any field of enquiry constitute a universe or

population.

 A complete enumeration of all the items in the population is known as a census

enquiry.

 However, this is not feasible and also involves time, money and energy.

 Hence for study purpose, only a few items from the universe are selected and this is

called a sample.

 The way of selecting a sample is known as sample design.

 Samples can either be probability samples or non-probability samples.

 Probability sampling includes simple random sampling, systematic sampling,

stratified sampling and cluster/ area sampling.

 Non-probability sampling includes convenience sampling, judgement sampling and

quota sampling techniques.

 Some of the important sampling designs are:

(a) Deliberate sampling (purposive sampling):

This method involves purposive or deliberate selection of particular units of

population. When the selection is done based on ease of access, it is called

convenience sampling and when the selection is done based on the researcher’s

judgement, it is called judgement sampling.

(b) Simple random sampling:

In this method, each item has equal chance of inclusion in the sample and each of

the possible samples in case of a finite populaion has the same probability of

being selected.

(c) Systematic sampling:

This method involves picking up some random items from the lists made for a

population (say every 5th item in a list or every 10th house in a street).

(d) Stratified sampling:

In this method, the population is stratified into a number of non-overlapping sub-

populations, after which sample items are selected from each stratum. If the items

selected from ecah stratum is based on simple random sampling, the method is

termed as stratified random sampling.

(e) Quota sampling:

In this method, stratified sampling is done such that each strata is given a quota

generally proportionate to the size of the stratum in the population. Hence this

sample is of non-probability type, with the samples being drawn based on

judgement rather than random.

(f) Cluster sampling and area sampling:

Cluster sampling involves grouping the population and then selecting the groups

or the clusters rather than individual elements for inclusion in the sample.

For example, 15,000 ATM card holders could be formed into 100 clusters of 150

card holders each. If the sample size is 450, then three clusters may be selected

randomly.

Area sampling involves dividing a large geographical area into a number of

smaller non-overlapping areas, generally called geographical clusters and then a

number of these smaller areas randomly thereby including all units in these small

areas. This applies to cases where the list of population concerned is not available.

(g) Multi-stage sampling:

This technique is meant for big inquiries extending to a considerably large

geographical area like an entire country. The first stage may be to select large

primary sampling units such as states, then districts, then towns and finally certain

families within towns. If the technique of random-sampling is applied at all stages,

the sampling procedure is described as multi-stage random sampling.

(h) Sequential sampling: This is somewhat a complex sample design where the

ultimate size of the sample is not fixed in advance but is determined according to

mathematical decisions on the basis of information yielded as survey progresses.

The sample design to be used must be decided by the researcher taking into consideration the nature of the inquiry and other related factors.

**6. Collecting the data:**

 Primary data can be collected either through experiment or through survey.

 Through experiments, the quantitative measurements can be observed.

 In the case of a survey, data can be collected by observation, personal interview,

telephone interview, mailing of questionaires or through schedules.

**7. Execution of the project:**

 The researcher should see that the project is executed in a systematic manner and in

time.

 If the survey is to be conducted by means of structured questionnaires, data can be

readily machine-processed.

 If the data are to be collected through interviewers, arrangements should be made for proper selection and training of the interviewers.

 Occasional field checks should be made to ensure that the interviewers are doing their assigned jobs properly.

**8. Analysis of data:**

 This requires a number of closely related operations such as establishment of

categories, the application of these categories to raw data through coding, editing and

tabulation and then drawing statistical inferences.

 Coding: Categories of data are transformed into symbols that may be tabulated and

counted.

 Editing is the procedure that improves the quality of the data for coding.

 Tabulation is a part of the technical procedure wherein the classified data are put in

the form of tables. This can be done using computers.

 In the process of analysis, relationships or differences supporting or conflicting with

original or new hypotheses should be subjected to tests of significance to determine

with what validity data can be said to indicate any conclusion.

**9. Hypothesis testing:**

 This is done through one or more of tests like chi-square test, t-test and F-test. Hypothesis test will result in either accepting the hypothesis or rejecting it.

**10. Generalisations and interpretation**:

 If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generalisation, i.e., to build a theory.

 If the researcher had no hypothesis to start with, he might seek to explain his findings on the basis of some theory. It is known as interpretation.

 The process of interpretation may quite often trigger off new questions which in turn

may lead to further researches.

11**. Preparation of the report or the thesis:**

The following aspects are to be considered:

(a) The layout of the report - (i) the preliminary pages; (ii) the main text, and (iii) the end matter.

i) The preliminary pages include title, date, acknowledgements, foreword, list of

tables and list of illustrations.

ii) The main text of the report should have:

Introduction which includes statement of the objective of the research,

explanation of the methodology adopted and the scope of the study along with

various limitations.

 Summary of the findings if they are extensive.

 Main report which should be presented in logical sequence and broken down

into readily identifiable sections.

 Conclusion wherein the results of the research must be put down clearly and

precisely.

iii) End matter should cover appendices, and bibliography

(b) Report should be written in a concise and objective style in simple language avoiding vague expressions.

(c) Charts and illustrations in the main report should be used only if they present the

information more clearly and forcibly.

(d) Calculated ‘confidence limits’ must be mentioned and the various constraints

experienced in conducting research operations may as well be stated.

**5. What is the significance of the research?**

(a) Research inculcates scientific and inductive thinking and it promotes the development

of logical habits of thinking and organisation.

(b) The role of research in several fields of applied economics,whether related to business or to economy as a whole has greatly increased in modern times.

(c) Research provides the basis for nearly all government policies in our economic

system. For example, allocation of nation’s resources; collecting information on the

economic and social structure of the nation.

(d) Research is significant in solving various operational and planning problems of

business and industry. Operations research, market research and motivational research help in taking business decisions.

(e) Research is important for social scientists in studying social relationships and in

seeking answers to various social problems.

(f) Research is significant in the following areas too:

 For students pursuing masters or PhD.

 To professionals as a source of livelihood.

 To philosophers and thinkers as an outlet for new ideas.

 To literary people, research may mean development of new styles and creative

work.

 To analysts and intellectuals for developing new theories.

**6. Briefly discuss the criteria of good research**

CRITERIA OF GOOD RESEARCH:

Scientific research to satisfy the following criteria:

(a) The purpose of the research should be clearly defined and common concepts be used.

(b) The research procedure used should be described in sufficient detail to permit another researcher to repeat the research for further advancement, keeping the continuity ofwhat has already been attained.

(c) The procedural design of the research should be carefully planned to yield results that are as objective as possible.

(d) The flaws in procedural design should be reported with complete frankness and their effects upon the findings should be clearly estimated.

(e) The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate. The validity and reliability of the data should be checked carefully.

(f) Conclusions should be confined to those justified by the data of the research and

limited to those for which the data provide an adequate basis.

(g) Greater confidence in research is warranted if the researcher is experienced, has a

good reputation in research and is a person of integrity.

The qualities of a good research are:

(a) Good research is systematic:

 It means that research is structured with specified steps to be taken in a specified

sequence.

 It does not rule out creative thinking but it certainly does reject the use of guessing

and intuition in arriving at conclusions.

(b) Good research is logical:

This implies that research is guided by the rules of logical reasoning and the logical

process of induction and deduction.

(c) Good research is empirical:

It implies that research is related basically to one or more aspects of a real situation

and deals with concrete data that provides a basis for external validity to research

results.

(d) Good research is replicable:

This characteristic allows research results to be verified by replicating the study and

thereby building a sound basis for decisions.

**. 7. What are the problems encountered by researchers in India?**

1. The lack of a scientific training in the methodology of research:

 Most of the research is not methodologically sound so that, the research results, quite often, do not reflect the realities.

 Hence researchers are to provided short duration intensive courses for meeting this

requirement.

2. Insufficient interaction between the university research departments on one side and business establishments, government departments and research institutions on the other side:

 A great deal of primary data of non-confidential nature remain untouched/untreated

by the researchers for want of proper contacts.

 Efforts should be made to develop satisfactory liaison among all concerned for better

and realistic researches.

 By developing some mechanisms of a university—industry interaction programmes,

academics can get ideas from practitioners on what needs to be researched and

practitioners can apply the research done by the academics.

3. Most of the business units in our country do not have the confidence that the material supplied by them to researchers will not be misused:

 For this reason they are reluctant in supplying the needed information to researchers.

 There is the need for generating the confidence that the information/data obtained

from a business unit will not be misused.

4. Research studies overlapping one another are undertaken quite often for want of

adequate information.

 This results in duplication and fritters away resources.

 This problem can be solved by proper compilation and revision, at regular intervals,

of a list of subjects on which and the places where the research is going on.

5. There does not exist a code of conduct for researchers and inter-university and

interdepartmental rivalries are also quite common.

6. The difficulty of adequate and timely secretarial assistance, including computerial

assistance which causes delays.

7. Library management and functioning is not satisfactory at many places and much of

the time and energy of researchers are spent in tracing out the books, journals, reports,etc., rather than in tracing out relevant material from them.

8. Many of our libraries especially those in distant places are not able to get copies of

government publications in time.

9. There is also the difficulty of timely availability of published data from various

government and other agencies doing this job.

10. There may, at times, take place the problem of conceptualization and also problems relating to the process of data collection and related things.

**8. What are the conditions to be met while defining a research problem?**

(i) There must be an individual or a group which has some difficulty or the problem.

(ii) There must be some objective(s) to be attained at. If one wants nothing, one cannot have a problem.

(iii) There must be alternative means (or the courses of action) for obtaining the objective(s) one wishes to attain. This means that there must be at least two means available to a researcher for if he has no choice of means, he cannot have a problem.

(iv) There must remain some doubt in the mind of a researcher with regard to the selection of alternatives. This means that research must answer the question concerning the relative efficiency of the possible alternatives.

(v) There must be some environment(s) to which the difficulty pertains.

**9. Explain the techniques involved in defining a problem.**

the research problem should be defined in a systematic manner, giving due weightage to all relating points.

1. statement of the problem in a general way; The problem stated in a broad general way may contain various ambiguities which must be resolved by cool thinking and rethinking over the problem. At the same time the feasibility of a particular solution has to be considered and the same should be kept in view while stating the problem.
2. understanding the nature of the problem; The next step in defining the problem is to understand its origin and nature clearly. The best way of understanding the problem is to discuss it with those who first raised it in order to find out how the problem originally came about and with what objectives in view. If the researcher has stated the problem himself, he should consider once again all those points that induced him to make a general statement concerning the problem.
3. surveying the available literature: All available literature concerning the problem at hand must necessarily be surveyed and examined before a definition of the research problem is given.This means that the researcher must be well-conversant with relevant theories in the field, reports and records as also all other relevant literature. He must devote sufficient time in reviewing of research already undertaken on related problems.
4. developing the ideas through discussions; Discussion concerning a problem often produces useful information. Various new ideas can be developed through such an exercise. Hence, a researcher must discuss his problem with his colleagues and others who have enough experience in the same

area or in working on similar problems. This is quite often known as an experience survey.

1. rephrasing the research problem into a working proposition.:

Finally, the researcher must sit to rephrase the research problem into a working proposition. Once the nature of the problem has been clearly understood, the

environment (within which the problem has got to be studied) has been defined, discussions over the problem have taken place and the available literature ha been surveyed and examined, rephrasing the problem into analytical or operational terms is not a difficult task.

**10. What are the points to be observed while selecting a research problem?**

The research problem undertaken for study must be carefully selected. The task is a difficult one,although it may not appear to be so.

(i) Subject which is overdone should not be normally chosen, for it will be a difficult task to throw any new light in such a case.

(ii) Controversial subject should not become the choice of an average researcher.

(iii) Too narrow or too vague problems should be avoided.

(iv) The subject selected for research should be familiar and feasible so that the related research material or sources of research are within one’s reach. Even then it is quite difficult to supply definitive ideas concerning how a researcher should obtain ideas for his research.

1. The importance of the subject, the qualifications and the training of a researcher, the costs involved, the time factor are few other criteria that must also be considered in selecting a problem.

(vi) The selection of a problem must be preceded by a preliminary study. This may not be necessary when the problem requires the conduct of a research closely similar to one that has already been done.

**11. Elaborate on the important concepts relating to research design.**

1. **Dependent and independent** variables: A concept which can take on different quantitativevalues is called a variable. As such the concepts like weight, height, income are all examples of variables. If one variable depends upon or is a consequence of the

other variable, it is termed as a dependent variable, and the variable that is antecedent to the dependent variable is termed as an independent variable.

2**. Extraneous variable:** Independent variables that are not related to the purpose of the study, but may affect the dependent variable are termed as extraneous variables. Whatever effect is noticed on dependent variable as a result of extraneous variable(s) is technically described as an ‘experimental error’. A study must always be so designed that the effect upon the dependent variable is attributed entirely to the independent variable(s), and not to some extraneous variable or variables.

**3. Control**: One important characteristic of a good research design is to minimise the influence or effect of extraneous variable(s). The technical term ‘control’ is used when we design the study minimising the effects of extraneous independent variables.

**4. Confounded relationship**: When the dependent variable is not free from the influence of extraneous variable(s), the relationship between the dependent and independent variables is said to be confounded by an extraneous variable(s).

**5. Research hypothesis**: When a prediction or a hypothesised relationship is to be tested by scientific methods, it is termed as research hypothesis. The research hypothesis is a predictive statement that relates an independent variable to a dependent variable. Usually a research hypothesis must contain,at least, one independent and one dependent variable.

**6 Experimental and non-experimental hypothesis-testing research:** When the purpose of research is to test a research hypothesis, it is termed as hypothesis-testing research. It can be of the experimental design or of the non-experimental design. Research in which the independent variable is manipulated is termed ‘experimental hypothesis-testing research’ and a research in which an independent variable is not manipulated is called ‘non-experimental hypothesis-testing research’.

**7. Experimental and control groups**: In an experimental hypothesis-testing research when a group is exposed to usual conditions, it is termed a ‘control group’, but when the group is exposed to some novel or special condition, it is termed an ‘experimental group’.

**8. Treatments**: The different conditions under which experimental and control groups are put are usually referred to as ‘treatments’. In the illustration taken above, the two treatments are the usual studies programme and the special studies programme.

**9. Experiment**: The process of examining the truth of a statistical hypothesis, relating to some research problem, is known as an experiment. Often, we undertake comparative experiments when we talk of designsof experiments.

**10. Experimental unit(s)**: The pre-determined plots or the blocks, where different treatments are used, are known as experimental units. Such experimental units must be selected (defined) very carefully.

**12. Write a note on the functions of a literature review.**

**Reviewing the literature**: -Essential preliminary task in order to acquaint yourself with the available body of knowledge in your area of interest. Literature review is integral part of entire research process and makes valuable contribution to every operational step. -Reviewing literature can be time-consuming, daunting and frustrating, but is also rewarding. Its functions are: a.

**Bring clarity and focus to your research problem** - The process of reviewing the literature helps you to understand the subject area better and thus helps you to conceptualise your research problem clearly and precisely. It also helps you to understand the relationship between your research problem and the body of knowledge in the area b**.**

**Improve your methodology** - A literature review tells you if others have used procedures and methods similar to the ones that you are proposing, which procedures and methods have worked well for them, and what problems they have faced with them. Thus you will be better positioned to select a methodology that is capable of providing valid answer to your research questions c. Broaden your knowledge- It ensures you to read widely around the subject area in which you intend to conduct your research study. As you are expected to be an expert in your area of study, it helps fulfill this expectation. It also helps you to understand how the findings of your study fit into the existing body of knowledge.

**d. Contextualise your findings**- How do answers to your research questions compare with what others have found? What contribution have you been able to make in to the existing body of knowledge? How are your findings different from those of others? For you to be able to answer these questions, you need to go back to your literature review. It is important to place your findings in the context of what is already known in your field of enquiry

**13. What are the steps involved in conducting a literature review? Describe them in detail.**

**i) search for existing literature in your area of study-** To effectively search for literature in your field of enquiry, it is imperative that you have in mind at least some idea of broad subject area and of the problem you wish to investigate,

1. books- BOOKS comprise a central part of any bibliography. Advantage-material published generally is of good quality and the findings are integrated with other research to form a coherent body of knowledge. Disadvantage-material is not completely up to date, as it can take a few years

between the completion of a work and publication in the form of a book.

2.journals -Journals provide you with the most up-to-date information, even though there is a gap of two to three years between the completion of a research project and the publication in a journal.

**ii) review the literature selected-** After identifying books and articles as useful, the next step is to start reading them critically to pull together themes and issues that are associated.

* Note whether the knowledge relevant to your theoretical framework is confirmed beyond doubt.

• Note the theories put forward, the criticisms of these and their basis, the methodologies adoptedand the criticisms of them.

• Examine to what extent the findings can be generalized to other situations. Ascertain the areas in which little or nothing is known-the gaps that exist in the body of knowledge**.**

**iii) develop a theoretical framework**- As you have limited time it is important to set parameters by reviewing the literature in relation to some main themes pertinent to your research topic. As you start reading the literature, you will realize that it deals with a number of aspects that have a 18 direct `and indirect bearing on your research topic. Use these aspects as a basis for developing your theoretical framework

**iv) develop a conceptual framework** The conceptual frame work is the basic sof your research problem it stem from the theortical frame work and usually focuses on the section which becomes the basis of your study. The conceptual frame work describes the aspects you selected from the thoratical framework to became basis of your enquiry

**14. Write a note on research design in the case of exploratory research studies.**

1. Exploratory research design: The Exploratory Research Design is known as formulative research design. The main objective of using such a research design is to formulate a research problem for an in-depth or more precise investigation, or for developing a working hypothesis from an operational aspect. The major purpose of such studies is the discovery of ideas and insights. Therefore, sucharesearchdesignsuitableforsuchastudyshouldbeflexibleenoughto provide opportunity for considering different dimensions of the problem understudy. The inbuilt flexibility in research design is required as the initial research problem would be transformed into a more precise one in the exploratory study, which in turn may necessitate changes in the research procedure for collecting relevant data.

a)

**15. Discuss the informal experimental designs in detail.**

(i) Before-and-after without control design-A single test group or area is selected and the dependent variable is measured. the treatment is then introduced and then the dependent variable is measured again. the effect of the treatment:the level of the phenomenon after the treatment-the level of the phenomenon before the treatment.

Test Area: treatment introduced

Treatment effect= (y) – (x)



level of phenomenon before treatment

(ii) After-only with control design-Two groups or areas (test area and control area) are selected and the treatment is introduced into the test area only

Treatment introduced

Test case:

Level of phenomenon after treatment(y)

Control area:

Treatment effect (y)-(z)

Level of phenomenon without treatment(z)

Before and after without control design:in this design two areas are selected and dependent variable is measured in both the areas for an identical time period before the treatment

**16. Describe the main steps of the sample design.**

1. Objectives The objective of the survey must be defined in clear and concrete terms. Generally, in survey a investigation team is not quite clear in mind as to what they want and how they are going to use the results. Some of the objectives may be immediate and some far-reaching.

Defining the Population The population from which sample is chosen should be defined in clear and unambiguous terms. The geographical, demographic and other boundaries of the population must be specified so that no ambiguity arises regarding the coverage of the survey.

Sampling Frame and Sampling Units The sampling unit is the ultimate unit to be sampled for the purpose of the survey. The sampling units must cover the entire population and they must be distinct, unambiguous and non-overlapping in the sense that every element of the population belongs to one and only one sampling unit. In a Socio economic survey, whether a family or a member of a family is to be the ultimate sampling unit.

4. Selection of Proper Sampling Design This is the most important step in planning a sample survey. There is a group of sampling designs (to be discussed later) and selection of the proper one is an important task.

5. Method of Collecton of Data For collection of data, either the interview method or the mail questionnaire method is to be adopted. Although the later method is less costly but there is a large scope of non-response in it

6. Data to be Collected Collection of data must be done in conformity with the objectives of the survey and the nature of the data. After it is decided upon, one must prepare a questionnaire or a schedule of enquiry

7. Field Work Organization Field work, itself has several stages and so it is to be well organized. The different stages include training the field workers, supervising the field workers, etc

**17. Explain the different types of sampling designs**.

**1 Non-Probability Sampling**- In this method, the sample is selected with a definite purpose in view and the choice of the sampling units depends entirely on the discretion and judgment of the investigator

* Purposive Sampling In this sampling the sample is selected with definite purpose in view and the choice of sampling units depends entirely on the discretion of the surveyor.
* Purposive Sampling In this sampling the sample is selected with definite purpose in view and the choice of sampling units depends entirely on the discretion of the surveyor.
* Deliberate Sampling In deliberate sampling, deliberate selection of sample is made so that any important unit could not be leftout

Merits of Non-Probability Sampling 1.

* This method of sampling is very simple
* Important units or members may be included in the sample.

Demirts

1. There is no place for probability in selection of units therefore sampling error cannot be obtained;
2. There is no guaranty of validity of the results from the sample selected by this method;

**Random or Probability Sampling** The technique of random sampling is of fundamental importance in the application of Statistics. Probability sampling is the scientific method of selecting samples accordingly to some laws

Merits of Random or Probability Sampling

1. No Plan for Selection There is no need to make any detailed plan for the selection of units.

2. Less Expensive In this method, money, time and hard work are very less.

Demerits

* Inappropriate This method is not appropriate where some units are so important to be included necessarily in the sample
* Less Independency This method is useless if the units of the population are dependent

**Mixed Sampling** If the samples are selected partly according to some laws of chance and partly according to a fixed rule, they are called mixed samples and the method of selecting such samples is known as mixed sampling

**18. Tabulate the difference between different research designs**.

19**. Discuss the methodologies involved in the collection of primary data.**

The task of data collection begins after a research problem has been defined and research design/plan chalked out.

The primary data are those which are collected afresh and for the first time, and thus happen to be original in character. The secondary data, on the other hand, are those which have already been collected by someone else and which have already been passed through the statistical process.

**The observation method** is the most commonly used method specially in studies relating to behavioural sciences. In a way we all observe things around us, but this sort of observation is not scientific observation. Under the observation method, the information is sought by way of investigator’s own direct observation without asking from the respondent,

**The interview method** of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. This method can be used through personal interviews and, if possible, through telephone

1. Personal interviews: Personal interview method requires a person known as the interviewer asking questions generally in a face-to-face contact to the other person or persons.
2. Telephone interviews: This method of collecting information consists in contacting respondents on telephone itself.

**20. Describe research design in the case of descriptive and diagnostic research studies**

Descriptive and diagnostic research design: A Descriptive Research Design is concerned with describing the characteristics of a particular individual or a group. Meanwhile, a diagnostic research design determines the frequency with which a variable occurs or its relationship with another variable. In other words, the study analyzing whether a certain variable is associated with another comprises a diagnostic research study. On the other hand, a study that is concerned with specific predictions or with the narration of facts and characteristics related to an individual, group or situation, are instances of descriptive research studies. Generally, most of the social research design falls under this category. As a research design, both the descriptive and diagnostic studies share common requirements, hence they are grouped together. However, the procedure to be used and the research design need to plan carefully. The research design must also make appropriate provision for protection against bias and thus maximize reliability, with due regard to the completion of the research study in an economical manner. The research design in such studies should be rigid and not flexibl

**. 21. What are the basic principles of experimental designs? Describe them in detail.**

Basic Principles of Experimental Designs : Professor Fisher has enumerated three principles of experimental designs:

**(1) the Principle of Replication**-the experiment should be repeated more than once. Thus, each treatment is applied in many experimental units instead of one. By doing so the statistical accuracy of the experiments is increased.

(**2) the Principle of Randomization**- The Principle of Randomization provides protection, when we conduct an experiment, against the effect of extraneous factors by randomization. In other words, this principle indicates that we should design or plan the experiment in such a way that the variations caused by extraneous factors can all be combined under the general heading of “chance.”

**(3) Principle of Local Control**- the extraneous factor, the known source of variability, is made to vary deliberately over as wide a range as necessary and this needs to be done in such a way that the variability it causes can be measured and hence eliminated from the experimental error..

23. What are the techniques of interpretation?

24. What are the mechanics of writing a research report? Describe them in depth.

25. What are the components of the case study method? Elucidate each one of them.

26. Write a note on different steps in writing a report.

27. Define intellectual property and related terminologies.

28. What is the rationale for the protection of intellectual property? Explain. 29. Describe the types of intellectual property in detail. 30. Write a note on the agencies responsible for intellectual property registration. 31. Write a note on the international organizations, agencies and treaties.