RESEARCH METHODS

TUTOR MARKED ASSIGNMENT (TMA)

NOTE: All Questions Are Compulsory

Section A

Answer the following question in about 1000 words each: **Marks 15x3=45**

1. Discuss the nature, types and steps of case study. Describe the criteria and misconceptions of case studies.

2. Explain the method, steps, relevance and implications of grounded theory. Describe the types of coding in grounded theory.

3. Elaborate the assumptions, approaches, steps, issues and implications of discourse analysis.

Section B

Answer the following questions in about 400 words each: **Marks 5x5=25**

4. Explain the methods of estimating reliability.

5. Explain the different types of variables.

6. Discuss the various types of validity.

7. Describe the importance and types of hypotheses.

8. Discuss the types, advantages and limitations of factorial research design.

Section C

Answer the following in about 50 words each: **Marks 10x3=30**

9. Content of research report.
10. Objectivity safeguards in research process.
11. Types of constructs.
12. Quota sampling.
13. Advantages and disadvantages of survey research.
14. Differences between Ex-post Facto and Experimental research.
15. Criteria for a good research design.
16. Quasi-experimental research design.
17. Advantages of correlational research design .
18. Ethnography.

ASSIGNMENT SOLUTIONS GUIDE (2021-22)

MPC-005: RESEARCH METHODS

Disclaimer/Special Note: These are just the sample of the Answers/Solutions to some of the Questions given in the Assignments. These Sample Answers/Solutions are prepared by Private Teacher/Tutors/Authors for the help and guidance of the student to get an idea of how he/she can answer the Questions given the Assignments. We do not claim 100% accuracy of these sample answers as these are based on the knowledge and capability of Private Teacher/Tutor. Sample answers may be seen as the Guide/Help for the reference to prepare the answers of the Questions given in the assignment. As these solutions and answers are prepared by the private teacher/tutor so the chances of error or mistake cannot be denied. Any Omission or Error is highly regretted though every care has been taken while preparing these Sample Answers/Solutions. Please consult your own Teacher/Tutor before you prepare a Particular Answer and for up-to-date and exact information, data and solution. Student should must read and refer the official study material provided by the university.

Section A

Answer the following question in about 1000 words each:

Q1. Discuss the nature, types and steps of case study. Describe the criteria and misconceptions of case studies.

Ans. Nature of Case Study: Case study provides a systematic and scientific way of perceiving or examining events, collect data, analyse information, and prepare a report. As a result the researcher may gain a sharpened understanding of why the instance happened as it did, and what might become important to look at more extensively in future research. Case studies lend themselves to both generating and testing hypotheses. In other words, case study should be defined as a research strategy, an empirical inquiry that investigates a phenomenon within its real-life context. Case study research means single and multiple case studies, can include quantitative evidence, relies on multiple sources of evidence and benefits from the prior development of theoretical propositions. Case studies based on any evidence of quantitative and qualitative research.

Single subject-research provides the statistical framework for making inferences from quantitative case-study data. According to Lamnek (2005) "The case study is a research approach, situated between concrete data taking techniques and methodologic paradigms." In the past years, case study method was used in the field of clinical psychology to examine the patient's previous history regarding the person's mental health status. To know about the patient's physical and mental health, and to make an accurate diagnosis, it is very important to know about the patient's past and present health related and environmental problems and issues.

Psychoanalyst Sigmund Freud used case study method to assist his subjects in solving personality problems. The detailed accounts of interviews with subjects and his interpretations of their thoughts, dreams and action provide excellent examples of case studies. Guidance counsellors, social workers and other practitioners conduct case studies for diagnosing particular condition or problem and recommending remedial measures. They collect data from a particular individual and confine their interest to the individual as a unique case or collect data from a small group of individuals, which form a unit for depth study.

The case study approach is based on reality. Some of these studies have been conducted in school environment, which have mostly centered on behavioural problems of children. Observation, interviews, psychological tests and inventories have been used for collecting relevant data about the case or cases. However, subjective bias is a constant threat to objective data gathering and analysis

techniques. The researcher must be thoroughly familiar with the skills which are associated with the conduct of case-studies.

The Case study is also useful in psychology. It refers to the use of a descriptive research approach to obtain an in-depth analysis of a person and group. The various techniques may be applied on the subject such as personal interviews, observation, psychometric tests, and archival records. We can use the case study method in clinical psychology to describe rare events and conditions. Generally case study is a single-case design, but it can be a multiple-case design, where replication instead of sampling is the criterion for inclusion. One thing we must remember about the case study is that it must provide valid and reliable results for the development of future research.

Types of Case Study: There are four types of case studies which are (i) illustrative case studies (ii) exploratory case studies (iii) cumulative case studies and (iv) critical instance case studies.

- **(1)** **Illustrative Case Studies:** These are primarily descriptive studies. They typically utilise one or two instances of an event to show what a situation is like. Illustrative case studies serve primarily to make the unfamiliar familiar and to give readers a common language about the topic in question.

- **(2)** **Exploratory (or pilot) Case Studies:** This type of case studies performed before implementing a large scale investigation. Their basic function is to help identify questions and select types of measurement prior to the main investigation. The primary pit fall of this type of study is that initial findings may seem convincing enough to be released prematurely as conclusions.

- **(3)** **Cumulative Case Studies:** These serve to aggregate information from several sites collected at different times. The idea behind these studies is the collection of past studies will allow for greater generalisation without additional cost or time being expended on new, possibly repetitive studies.

- **(4)** **Critical Instance Case Studies:** These examine one or more sites for either the purpose of examining a situation of unique interest with little to no interest in generalisability, or to call into question or challenge a highly generalised or universal assertion. This method is useful for answering cause and effect questions.

Steps for Case Study: The following steps are used in the conduct of a case study:

Step 1. Determining the present status of the case or cases: The first step is to determine the present status of the case or cases through direct observation. In addition to physical examination of the case or cases, a psychological evaluation is required to determine the general ability level etc. For example, to make a case study of a 'slow learner', the first thing to do is to determine the present status of the child by making an assessment of his physique cognitive factors through direct observation and psychological test.

Step 2. Identifying the most probable antecedents of the case or cases: Determining the most probable antecedents of the case or cases is the next important steps. This information helps in formulating a workable hypothesis or a set of hypothesis. For example, in case of 'slow learner' cited in Step 1, the researcher may formulate a hypothesis that occurrence of slow learning behaviour in the child is due to unhealthy have environment, bad study habits and poor teaching in the school.

Step 3. Verification of Antecedents/Hypotheses: The case is then checked for the presence or absence of the antecedents supposed to apply to situation of under study. For example, the behaviour of slow learning of the child. This involves multi-method approach, which includes observation, past history of the case, interview etc.

Step 4. Diagnosis and Remedial Measures: After the verification of the antecedents or hypothesis (es , the next step is directed towards the diagnosis of the causes (example, causes of slow learning) and suggesting remedial measures in the light of the causes.

Step 5. Follow-up of the case or cases: The last step of the case study is the follow-up of the case (es) to study the impact of remedial measures. If impact is positive, the diagnosis is taken to be correct.

Misconception about Case Study: There is little misconception about the case study for using in research work. Flyvbjerg (2006) define five misconceptions about case study research:

- Generally, theoretical knowledge is more valuable than concrete, practical knowledge, because one cannot generalise on the basis of an individual case and, therefore, the case study cannot contribute to scientific development.
- The case study is most useful for generating hypotheses, whereas other methods are more suitable for hypotheses testing and theory building.
- The case study may affect the bias tendency toward verification, i.e., a tendency to confirm the researcher's preconceived notions.
- Some time it is difficult to summarise and develop general propositions and theories on the basis of specific case studies.

Q2. Explain the method, steps, relevance and implications of grounded theory. Describe the types of coding in grounded theory.

Ans. Methods of Grounded Theory: Unlike other methods of qualitative research, the grounded theorists do not believe in collecting data through taping and transcribing interviews as it is believed to be a waste of time in grounded theories. The process of grounded theories is far quick and faster as the researcher delimits the data by field-noting interviews and soon after generates concepts that fit with data, are relevant and work in explaining what participants are doing to resolve their main concern.

Discussing about the theory before it is written up drains the researcher of motivational energy. Discussions and talks can either render praise or criticism, and both diminish the motivational drive to write memos that develop and refine the concepts and the theory (Glaser, 1998). Data is a fundamental property of the grounded theory which means that everything that gets in the researcher's way when studying a certain area is data. Not only interviews or observations but anything is data that helps the researcher generating concepts for the emerging theory. Field notes can come from informal interviews, lectures, seminars, expert group meetings, newspaper articles, Internet mail lists, even television shows, conversations with friends etc. It is even possible, and sometimes a good idea, for a researcher with much knowledge in the studied area to interview own self, treating that interview like any other data, coding and comparing it to other data and generating concepts from it. Interviewing one's own self helps in gaining an insight from the knowledge that the researcher has at the conceptual level and grounded theory deals with nothing but the conceptual level data.

Steps of Grounded Theory: Grounded theory approach helps in generating theories on the basis of the following systematic steps –

Memoing: The first objective of the researcher is to collect data in form of memos. Memos are a form of short notes that the researcher writes and prepares. These memos act as a source of data which is further put in other processes of anlysis and interpretation. These short notes or memos can be prepared in three ways:

- **Theoretical note:** This form of note contains the details regarding how a textual data base is related to the existing literature of the concerned study. The note consists of about one to five pages, Anyhow, the final theory and report consists of an integration of several such theoretical notes.
- **Field note:** Field note consists of the notes prepared when the researcher actively participates with the population/ culture or the community under study. It can be the observations of behaviours, interactions, events or situations that occurs on the spot and it also contains the causal notes behind such actions.
- **Code notes:** The researcher or the ground theorist may also prepare notes by naming, labelling or categorising things, properties and events. The code notes are those notes which discuss the codes of such labelling. These code notes further acts as a source of formation of

final reports. Further, these code notes also acts as a guide to the ground theorists while analysing a text or a case.

Sorting in Grounded Theory: Once the short notes or the memos are prepared, the collected information (or the data) is sorted in order to organise them in proper order. Sorting helps in putting all the data in proper order which leads to proper linkage of information and ideas. The researcher may also get an insight of some more relevant information and ideas which were not revealed during the preparation of memos.

Writing in Grounded Theory: After the memos are sorted, the next stage towards preparation of theory is "writing". The ground theorist arranges, relates and puts the collected information in to words. Therefore, in this step the researcher tries to give a shape as well as meaning to the relevant data. This may be said to be a crucial stage, as it is this stage in which the researcher interprets the information on the basis of his own perspectives. The collected information is also linked with the existing relevant literature in order to put the theory in a scholarly context.

Relevance of Grounded Theory: The data or the information collected and the theory generated with the help of grounded theory is significant because –

- The ground theorists prepare report on the basis of information collected with the help of various sources which increases the chances of reliability and validity of the theory.
- The ground theory approach gives an opportunity for exploring the facts and analysing the causal reasons behind those facts.
- It is an inductive type of research which has its basis or is 'grounded' on the base of observations and data collected.
- The grounded theory approach also provides a base to specify how a knowledge base should be changed in the light of new information.
- The grounded theory data often categorises data which further forms a basis for organising and reporting results.

Implications of Grounded Theory: On the basis of the significance and importance of the research based grounded theory, the discipline of research is having much gains and benefits. Following are some of the important implications of the grounded theory approach:

- Grounded theory is often used in formulation of policies and program evaluation research, since it can more effectively help in solving the unanswered questions,
- Grounded theory approach can also be used to analyse the consumers' demands and preferences in the existing market.
- The approach can also be used to analyse product positioning and advertising opportunities.
- It is one of the best theoretical approaches that can be used in the field of education, management, women's studies, information studies, politics and communities, etc.
- It helps in understanding, analysing and describing human psychology and experience.

Types of Coding In Grounded Theory: Ground theorists analyse and categorise events and try to identify the meaning of the text with the help of the prepared code notes. Preparation of the code notes can be done in three ways:

Selective Coding: In this type of coding out of all the available categories, the ground theorist selects one category to be the center or the major one and then tries to relate the other categories with the selected major category. In this way, the ground theorist tries to analyse how other categories are affecting the major category or how the major category is having an effect on the other related categories.

Open Coding: It is the process of identifying, labeling and analysing the phenomena found in the text. The ground theorist on the basis of generalisation categorises names, events or properties in to more general categories or dimensions.

Axial Coding: It is the process of relating the categories or properties (that is the codes) to each other with the help of deductive and inductive thinking. The ground theorists try to analyse the causal relations between these variables, that is, which of the code is the 'cause' which has led to the occurrence of other codes- the 'context'. The ground theorist analyses and interprets the 'cause' codes

and the 'context' codes without showing much interest on the 'consequences' of the phenomenon itself.

Q3. Elaborate the assumptions, approaches, steps, issues and implications of discourse analysis.

Ans. Assumptions of Discourse Analysis: Theoretically discourse analysis is an interdisciplinary approach and has been widely used by the social scientists and cognitive psychologists. Some of the basic assumption of this approach can be outlined as follows:

Psychologists assume that the human behaviour can only be studied with objectivity that is, without involvement of any biasness or subjectivity of the researcher as well as the subject/people under study. However, this has been disputed – people, including researchers, cannot be objective. A researcher is very likely to hold some position (expectation, belief, or set of cultural values) when they are conducting their research.

Those expectations may be revealed while interpreting and explaining the events and experiences. The approach also assumes that, reality is socially constructed. It is assumed in a scientific research that 'reality' can be categorised. The constructs generally used by psychologists like – personality, intelligence and thinking are explained as real and naturally occurring categories or events. However, the assumption ignores the fact that it is language which gives a shape to the categories and constructs we use. Since language is a social and cultural thing, our sense of reality is socially and culturally constructed.

It is also assumed that, people are the result of social interaction. In the scientific approach it is assumed that many of the constructs used are 'inner essences'. That is to say that personality, anxiety, drives, and so on exist somewhere within our heads and our bodies and are revealed only when the individual socially interacts with others. However, it may be the case that many of these so-called essences are actually the products of social interaction.

Approaches or Theories of Discourse Analysis: There are numerous "types" or theories of discourse analysis. The various discourses has been explained or categorised on basis of several theories and approaches. Some of them are:

Modernism: The theorists of modernism were guided by achievement and reality based orientation. Thereby they viewed discourse as being relative to talking or way of talking. They emphasised that the discourse and language transformations are needed to develop new or more "accurate" words in order to describe new inventions, innovations, understandings, or areas of interest. Both language and discourse are now conceptualised as natural or real products of common sense usage or progress. Modernism gave rise to various discourses of rights, equality, freedom, and justice.

Structuralism: The structuralism theorists squabble that the human actions and social formations are related to language and discourse and they can be implicated or considered as systems of related elements. The approach believed that the individual elements of a system only have significance when they are considered in context to the structure as a whole. The structures can be defined as self-contained, self-regulated, and self-transforming entities. In other words, it is the structure itself that determines the significance, meaning and function of the individual elements of a system. Structuralism has made an eminent contribution to the world of language and social systems.

Postmodernism: Unlike the approaches of the modern theory, the postmodern theorists examined and investigated the variety of experience of individuals and groups and emphasised more on differences over similarities and common experiences. Postmodern researchers insisted more upon analysing discourses as texts, language, policies and practices. In the field of discourse analysis, the most prominent figure was Michel Foucault. Foucault (1977, 1980) has defined discourse as "systems of thoughts composed of ideas, attitudes, courses of action, beliefs and practices that systematically construct the subjects and the worlds of which they speak." He emphasised that the discourse analysis has a significant role in social processes of legitimating and power. Discourses can help researchers in emphasising the construction of current truths, how they are maintained and what power relations they carry with them. He later added that discourse is a channel through which power relations (for example– power relation between boss and subordinate, professor and students)

produce speaking subjects and that power is an in evitable or unavoidable aspect. Foucault (1977, 1980) argued that power and knowledge are inter-related and therefore every human relationship is a struggle and negotiation of power. Discourse according to Foucault (1977, 1980, 2003) is related to power as it operates by rules of exclusion. Postmodernism was one of the mid- to late 20th century development and believes that the human mind is free from the constraints of tradition, belief, faith and tries to explore the furthermost horizons of human development.

Feminism: Feminists explained discourse as events of the social practices. They investigated the complex relationships that exist among power, ideology, language and discourse. They emphasised on the concept of 'performing gender'. According to them gender is a property, not of persons themselves but of the behaviours to which members of a society ascribe a gendering meaning.

Steps in Discourse Analysis: The method of discourse analysis evaluates the patterns of speech, such as how people talk about a particular subject, what metaphors they use, how they take turns in conversation, and so on. These analysts see speech as a performance. The analysts or the researchers of the discourse analysis believe that the speech performs an action instead of describing a specific state of affairs or specific state of mind. Much of this analysis is intuitive and reflective, but it may also involve some form of counting, such as counting instances of turn-taking and their influence on the conversation and the way in which people speak to others.

The researchers collect and interpret information in the following steps:

   (i)   **Target orientation:** First of all, the analysts need to know their target or focus of study. Since beginning, they need to think about the ways by which they will analyse and interpret data after collecting the information.

   (ii) **Significance of data:** Once the relevant information is collected, the researchers need to judge or examine the value of the collected data, especially those which may have come from more than one source.

   (iii) **Interpretation of the data:** As the research progresses the analyst needs to try to understand and interpret the data so that the researchers as well as others can gain an understanding of what is going on.

   (iv) **Analysis of the findings:** Finally, the researcher needs to undertake the mechanical process of analysing, interpreting and summarising the data collected. On basis of the analysis of the information, the findings can be summarised and concluded. There are many qualitative analysis programs available to social researchers that can be used for a variety of different tasks. For example, software could locate particular words or phrases; make lists of words and put them into alphabetical order; insert key words or comments; count occurrences of words or phrases or attach numeric codes. With the help of the software's, the analysts or the researcher can retrieve text, analyse text and build theories. Although a computer can undertake these mechanical processes, it cannot think about, judge or interpret qualitative data.

Issues of Reliability and Validity in Discourse Analysis: No doubt the method of discourse analysis has been well appreciated and it is being used by several disciplines, yet the approach or the methodology of this analysis lacks reliability and validity on certain grounds, like

*   Since the method of discourse analysis lacks a proper format or guideline, the processing of data through this approach is controversial.
*   Further, the interpretation of the information collected through this data is again questionable, as it may involve the subjectivity or biasness of the researcher or the analysts.
*   As there is no hard data provided through discourse analysis, the reliability and the validity of one's research/findings depends on the force and logic of one's arguments. Even the best constructed arguments are subject to their own deconstructive reading and counter-interpretations.
*   The validity of critical analysis is, therefore, dependent on the quality of the rhetoric. Despite of the above controversies and arguments, the method is well appreciated and withholds a good position and has certain concrete applications.

Implications of the Discourse Analysis: With the usage of talks, languages and texts the analysts or the researchers can easily understand the connotations behind historical events as well as current social practices.

Some of the other relevance or significance of this approach are:

- Discourse analysis enable us to understand the conditions behind a specific "problem" and make us realise that the essence of that "problem".
- Discourse Analysis helps us in gaining a comprehensive view of the "problem" and helps ourselves to relate with that "problem".
- It helps the researcher in understanding hidden motivations within ourselves and researchers as well and therefore enable us to solve concrete problems.
- Though critical thinking about and analysis of situations/texts is as ancient as mankind or philosophy itself, and no method or theory as such.
- It helps in meaningful interpretation of the people and the world.
- It also aids in "deconstructing" concepts, belief-systems, or generally held social values and assumptions.
- Discourse Analysis can be applied to any text that is, to any problem or situation and requires no guidelines to be followed.

Section B

Answer the following questions in about 400 words each:

Q4. Explain the methods of estimating reliability.

Ans. Methods of Estimating Reliability: There are number of ways of estimating reliability of an instrument. Various procedures can be classified into two groups:

- External consistency procedures
- Internal consistency procedures

External Consistency Procedures: External consistency procedures compare findings from two independent process of data collection with each other as a means of verifying the reliability of the measure. Two methods are as beneath.

Test Re-test Reliability: The most frequently used method to find the reliability of a test is by repeating the same test on same sample, on two different time periods. The reliability coefficient in this case would be the correlation between the score obtained by the same person on two administrations of the test.

Test-Retest reliability is estimated, when same test is administered on same sample. Therefore, if refers to the consistency of a test among on two different time periods different administrations. The assumption behind this approach is that there will be no substantial changes in the measurement of the construct in question, upon administration on separate occasions. The time gap that is given between measures is of critical value, the shorter the time gap, higher the correlation value and vice versa. If the test is reliable, the scores that are attained on first administration should be more or less equal to those obtained on second time also. The relationship between the two administrations should be highly positive.

Parallel Forms Reliability: Parallel-Forms Reliability is known by the various names such as Alternate forms reliability, equivalent form reliability and comparable form reliability. Parallel forms reliability compares two equivalent forms of a test that measure the same attribute. The two forms use different items. However, the rules used to select items of a particular difficulty level are the same. When two forms of the test are available, one can compare performance on one form versus the other. Sometimes the two forms are administered to the same group of people on the same day. The Pearson product moment correlation coefficient is used as an estimate of the reliability. When both forms of the test are given on the same day, the only sources of variation are random error and the difference between the forms of the test. Sometimes the two forms of the test are given at different times. In these cases, error associated with time sampling is also included in the estimate of reliability.

Internal Consistency Procedures: The idea behind internal consistency procedures is that items measuring same phenomena should produce similar results. Following internal consistency procedures are commonly used for estimating reliability-

Split Half Reliability: In this method, as the name implies, we randomly divide all items that intends to measure same construct into two sets .The complete instrument is administered on sample of people and total scores are calculated for each randomly divided half; the split half reliability is then, the simply the correlation between these two scores.

Kudar-Richardson Estimate of Reliability: The coefficient of internal consistency could also be obtained with the help of Kudar-Richardson formula number 20. One of the techniques for item analysis is item difficulty index. Item difficulty is the proportion or percentage of those answering correctly to an item. For example – symbol 'p' is used to represent the difficulty index. Suppose an item 'X' has p=0.67.this means item 'X' was answered correctly by 74% of those who answered the item.

$$KR\text{-}20 = \frac{N}{N-1} \left(1 - \frac{\Sigma\, pq}{\sigma^2} \right)$$

Where

N = the number of items on the test,

σ^2 = the variance of scores on the total test,

p = the proportion of examinees getting each item correct,

q = the proportion of examinees getting each item wrong.

Cronbach's Alpha (α): As proposed by Cronbach (1951) and subsequently elaborated by others (Novick & Lewis, 1967; Kaiser & Michael, 1975), coefficient alpha may be thought of as the mean of all possible split-half coefficients, corrected by the Spearman-Brown formula .The formula for coefficient alpha is

$$r_\alpha = \left(\frac{N}{N-1} \right) \left(1 - \frac{\Sigma\, \sigma^2_j}{\sigma^2} \right)$$

Where r_α is coefficient alpha,

N is the no. of items,

σ^2_j is the variance of one item,

$\Sigma\sigma^2_j$ is the sum of variances of all items, and

σ^2 is the variance of the total test scores.

Q5. Explain the different types of variables.

Ans. Types of Variables: To understand how variables are used and discussed in psychological researches, you would like to understand several distinctions that are made among the type of variables. The descriptions of different types of variables are given below:

Stimulus, Organism and Response Variables: Psychologists are interested in studying the behaviour or causes of behaviour as variables. Many psychologists have adopted a theoretical viewpoint or model called the S-O-R model to explain all behaviour. The symbols S, O, and R represent different categories of variables. S is the symbol of stimuli, and the category may be referred to in general as stimulus variables. A stimulus variable is some form of energy in the environment, such as light, to which the organism is sensitive. O is the symbol for organism variables that is the changeable physiological and psychological characteristics of the organisms being observed. Examples of such variables are anxiety level, age and heart rate etc. Finally, R is the symbol for response and, in general,

response variables, which refer to some behaviour or action of the organism like pressing a lever, and reaction to any stimulus, are the examples of responses variables. You can understand an application of S-O-R model through the following example.

Independent and Dependent Variables: An *independent variable* or stimulus variable (as Underwood calls it) is that factor manipulated or selected by the experimenter in his attempt to ascertain its relationship to an observed phenomenon.

A dependent variable is the factor that appears, disappears, or varies as the experimenter introduces, removes or varies the independent variable. The dependent variable is a measure of the behaviour of the subject. The dependent variable is the response that the person or animal makes. This response is generally measured using at least one of several different dimensions (Alberto & Troutman 2006). The dimensions are – (a) frequency – Number of times that a particular behaviour occurs, (b) duration - the amount of time that a behaviour lasts. (c) Latency –the amount of time between and when the behaviour is actually performed (d) force – the intensity or strength of a behaviour.

Extraneous and Confounded Variables: Any and all other variables that may 'mask' the relationship between independent variable and dependent variable are known as extraneous variables. Extraneous variables may directly affect the dependent variable or may combine with the independent variable to produce an affect. Therefore, extraneous variables must be controlled so that the experimenter can determine whether the dependent variable changes in relation to variation in the independent variable. *Confounded variables* is one that varies with the independent variable. While doing a study if we are not careful then two variables may get combined so that the effect of one cannot be separated from the effect of other. This is known as confounding. For instance, if you conducted a study of the effect of television viewing on perception of violence and the experimental group contained only adolescents, whereas the control group only adults, the age of participants would be confounded with the independent variable under study. Confounding makes the conclusions of the study doubtful. It is, therefore, necessary that effort should be made to unconfound the variables.

Active and Attribute Variables: Any variable that is manipulated is called active variables. Examples of active variables are reward, punishment, methods of teaching, creating anxiety through instructions and so on. Attribute variable isthat variable which is not manipulated but measured by the experimenter. Variables that are human characteristics like intelligence, Aptitudes, sex, socio economic status, education, field dependence and need for achievement are the example of attributes variables. The word 'attribute' is more accurate enough when used within animated objects or references. Organisations, institutions, groups, population and geographical areas have attributes. Organisations are variably productive; groups differ in cohesiveness; geographical areas vary widely in resources.

Quantitative and Categorical Variables: Quantitative variables is one that varies in amount whereas categorical variables varies in kind. Speed of response, intensity of sound, level of Illumination, intelligence etc. are the example of quantitative variables and gender, race, religion are the example of categorical variables. Precise and accurate measurement are possible with the quantitative variables because they can be easily ordered in terms of increasing and decreasing magnitude categorical variables can be of three types: Constant, dichotomous and polytomous.

Continuous Variables and Discrete Variables: Quantitative variables are further divided into two categories, namely, continuous variables and discrete variables. A distinction between continuous and discrete variables is especially useful in planning of research and analysis of data. A continuous variable is one which is capable of being measured in any arbitrary degree of fineness or exactness. Age, height, intelligence, reaction time, etc., are some of the examples of a continuous variable. The age of the person can be measured in years, month and days. Thus, all such variables which can be measured in the smallest degree of fineness are called continuous variable. The discrete variables are those variables which are not capable of being measured in any arbitrary degree of fineness or exactness because the variables contain a clear gap. For example, the number of members in a family,

no. of females in particular group, no of books in library and so on constitutes the examples of a discrete variable.

Q6. Discuss the various types of validity.
Ans. There are six types of validity, viz., (i) Content validity (ii) Criterion-related validity (iii) Con current validity (iv) Predictive validity (v) Construct validity (vi) Convergent validity (vii) Discriminate validity and (viii) Face validity. These are being discussed below:

Content Validity: It is a non-statistical type of validity with involvement of assessment of the content of the test to ascertain whether it includes the sample representative of the behaviour that is intended to be measured. When a test has content validity, the items on the test represent the entire range of possible items the test should cover. For instance, if researcher wants to develop an achievement test of spelling for the third grade children then a researcher could identify nearly all the possible words that third grade children should know. Individual test items may be taken from a huge group of items that include a broad range of items.

Criterion-related Validity: Criterion related validity is the idea that a valid test should relate closely to other measure of the same theoretical concept. A valid test of intelligence should correlate highly with other intelligence test. If a test demonstrates effective predicting criterion or indicators of the construct, it is said to possess criterion – related validity. There are two different types of criterion validity:

Concurrent Validity: Its occurrence is found when criterion measures are achieved at the same time as the test scores. It reflects the degree to which the test scores estimate the individual's present status with regards to criterion. For instance, if a test measures anxiety, it would be said to have concurrent validity if it rightly reflects the current level of anxiety experienced by an individual. Concurrent evidence of test validity is usually desirable for achievement tests and diagnostic clinical test.

Predictive Validity: Predictive validity occurs when criterion measures are obtained at a time after the test. For example, aptitude tests are useful in identifying who will be more likely to succeed or fail in a particular subject. Predictive validity is part curly relevant for entrance examination and occupational test.

Construct Validity: Construct validity approach is complex than other forms of validity. Mc Burney and White (2007) defined construct validity as the property of a test that the measurement actually measures the constructs they are designed to measure. There are several ways to determine whether a test generate data that have construct validity.

    (i)   The test should actually measure whatever theoretical construct it supposedly tests, and not something else. For example a test of leadership ability should not actually test extraversion

    (ii)   A test that has construct validity should measure what it intends to measure but not measure theoretically unrelated constructs. For example, a test of musical aptitude should not require too much reading ability.

    (iii)   A test should prove useful in predicting results related to the theoretical concepts it is measuring. For example, a test of musical ability should predict who will benefit from taking music lessons, should differentiate groups who have chosen music as a career from those who haven't should relate to other tests of musical ability and so on.

There are two types of construct validity— 'convergent validity' and 'divergent validity' (or discriminant validity).

Convergent Validity: It means the extent to which a measure is correlated with other measure which is theoretically predicted to correlate with.

Discriminant Validity: This explains the extent to which the operationalisation is not correlated with other operationalisations that it theoretically should not be correlated with.

Face Validity: Face validity refers to what appears to measure superficially. It depends on the judgment of the researcher. Each question is scrutinised and modified until the researcher is satisfied that it is an accurate measure of the desired construct. The determination of face validity is based on the subjective opinion of the researcher.

Q7. Describe the importance and types of hypotheses.

Ans. Types of Hypotheses: Any assumption that you seek to validate through investigation is called hypotheses. Hence theoretically, there should be one type of hypotheses on the basis of the investigation that is, research hypothesis. However, because of the conventions in scientific enquiries and wording used in the constructions of the hypothesis, Hypotheses can be classified into several types, like; universal hypotheses, existential hypotheses, conceptual hypotheses etc. Broadly, there are two categories of the hypothesis:

i) Null hypothesis

ii) Alternative hypothesis

Null Hypothesis: Null hypothesis is symbolised as Ho. Null hypothesis is useful tool in testing the significance of difference. In its simplest form, this hypothesis asserts that there is no true difference between two population means, and the difference found between sample means is, accidental and unimportant, that is arising out of fluctuation of sampling and by chance. Traditionally null hypothesis stated that there is zero relationship between terms of the hypothesis. For example, (a) schizophrenics and normal do not differ with respect to digit span memory (b) There is no relationship between intelligence and height.

The null hypothesis is an important component of the decision making methods of inferential statistics. If the difference between the samples of means is found significant the researcher can reject the null hypothesis. It indicates that the differences have statistically significant and acceptance of null hypothesis indicates that the differences are due to chance. Null hypothesis should always be specific hypothesis i.e. it should not state about or approximately a certain value.

The null hypothesis is often stated in the following way:

$$H_o: \mu_{HV} \le \mu_{LV}$$

Alternative Hypothesis: Alternative hypothesis is symbolised as H1 or Ha, is the hypothesis that specifies those values that are researcher believes to hold true, and the researcher hopes that sample data will lead to acceptance of this hypothesis as true. Alternative hypothesis represents all other possibilities and it indicates the nature of relationship.

The alternative hypothesis is stated as follows:

$$H_1: \mu_{HV} > \mu_{LV}$$

The alternative hypothesis is that the mean of population of those who have the vocabulary is grater than the mean of those to lack the vocabulary. In this example the alternative hypothesis is that the experimental population had higher mean than the controls. This is called directional hypothesis because researcher predicted that the high vocabulary children would differ in one particular direction from the low vocabulary children. Sometimes researcher predicts only that the two groups will differ from each other but the researcher doesn't know which group will be higher. This is non directional hypothesis.

The null and alternative hypothesis in this case would be stated as follows:

$$H_o: \mu_{1=}\mu_2$$

$$H_1: \mu_1 ? \mu_2$$

Q8. Discuss the types, advantages and limitations of factorial research design.

Ans. Factorial experiments may be conducted either within subject or between subjects. A mixed factorial design is also used in psychology. A mixed factorial design is one that has at least one within subject variable and at least one between subject variable.

Within Subject Factorial Design: In an experiment by Godden & Baddeley (1975), researcher wants to study the effect of context on memory. They hypothesised that memory should be better when the condition at test are more similar to the conditions experienced during learning. To operationalise this idea Godden and Baddeley decided to use a very particular population: deep-sea divers. The divers

were asked to learn a list of 50 unrelated words either on the beach or under 10 feet of water. The divers were then tested either on beach or under sea. The divers were tested in both the environment in order to make sure that any effect observed could not be attributed to a global effect of one of the environment. The first independent variable is the place of learning. It has 2 levels (on the beach and undersea). The second independent variable is the place of testing. It has two levels (on the beach and undersea). These 2 independent variables gives 4 experimental conditions:

- Learning on the beach and recalling on the beach.
- Learning on the beach and recalling under sea.
- Learning under sea and recalling on the beach.
- Learning under sea and recalling under sea.

Each subject in this experiment was tested in all four experimental condition. The list of words was randomly created and assigned to each subject. The order of testing was randomised in order to control the carry over effect.

Testing Place B	Onland A_1	Under Sea A_2
B_1	S_1 S_2 S_3 S_4 S_5 S_6	S_1 S_2 S_3 S_4 S_5 S_6
B_2	S_1 S_2 S_3 S_4 S_5 S_6	S_1 S_2 S_3 S_4 S_5 S_6

Between Subject Factorial Design: A between subject facotoria design is presented in the following table. The example is 2×2 design. Separate groups of six experience each condition, thus requiring 24 subjects to get six responses to each of four conditions.

Factor-B	A_1	A_2
B_1	S_1 S_2 S_3 S_4 S_5 S_6	S_{13} S_{14} S_{15} S_{16} S_{17} S_{18}
B_2	S_7 S_8 S_9 S_{10} S_{11} S_{12}	S_{19} S_{20} S_{21} S_{22} S_{23} S_{24}

Mixed Factorial Design: Some time the researcher uses mixed factorial design. Researcher has two independent variable A and B. Variable A is the within subject variable and variable B is the between subject variable. Subject either experiences B1, once with A1 and also with A2; or they experience B2 once with A1 and also with A2.

For example we want to study the effect of gender and alcohol on risk taking while driving. Here we have two independent variables gender (A) and alcohol level (B). Suppose we have decided to operationalise the independent variable 'alcohol level' by having four concentration levels. We decide to have each subject observed in each alcohol condition. The order of administration of each condition will be randomised for each subject. The measures are non repeated for the factor (A) gender and repeated for the factor (B) alcohol level.

Suppose we have 10 subjects 5 males and 5 females. The experimental lay out will be as follows :

Between Subject Variables	Within Subject Variable			
A	B_1	B_2	B_3	B_4
A_1	S_1 S_2 S_3	S_1 S_2 S_3	S_1 S_2 S_3	S_1 S_2 S_3
	S_4 S_5	S_4 S_5	S_4 S_5	S_4 S_5
A_2	S_6 S_7 S_8 S_9 S_{10}	S_6 S_7 S_8 S_9 S_{10}	S_6 S_7 S_8 S_9 S_{10}	S_6 S_7 S_8 S_9 S_{10}

Advantage of Factorial Design: Factorial design enables the researcher to manipulate and control two or more independent variables simultaneously. By this design we can study the separate and combined effect of number of independent variables. Factorial design is more precise than single factor design. By factorial design we can find out the independent or main effect of independent variables and interactive effect of two or more independent variables. The experimental results of a factorial experiment are more comprehensive and can be generalised to a wider range due to the manipulation of several independent variables is one experiment.

Limitation of Factorial Design: Sometime especially when we have more than three independent variables each with three or more levels are to be manipulated together, the experimental setup and statistical analysis become very complicated. In factorial experiments when the number of treatment combinations or treatments become large, it becomes difficult for the experimenter to select a homogeneous group.

Section C
Answer the following in about 50 words each:
Q9. Content of research report.
Ans. Since the research reports are not only a descriptive summary of the overall findings, they also act as a guide for future research in similar areas, the documentation of the report is very crucial and sensitive. The report should have a record of enough information which can be easily understood and followed as and when required. There a several ways in which the contents of a report is prepared. One of them can be discussed as follows:

(1) **Title Page:** The first page of the report contains the details of the topic of the research as well as the name of the organisation that is being, or has a product/service/ program that is being researched as well as the date.

(2) **Table of Contents:** After getting done with the title page, the researcher prepares the list of contents of the research work and their page numbers.

(3) **Executive Summary:** Then the report contains an executive summary or abstract of the research and its findings. It is usually a one-page, concise overview of findings and recommendations of the research conducted.

(4) **Purpose of the Report:** The purpose of the report shows the aims and objectives of the research. It also shows the details of the type of the research (qualitative or quantitative) that was used by the researcher.

(5) **Contextual background of the research target:** This topic shows a historical background of the people/ event/ practice/ program/organisation under study. It also mentions the problem that needs to be studied and also the over all goals of the research as well as the suggested outcomes of the research. The topic also shows what questions are being answered by conducting the present research.

(6) **Methodology:** Measures and procedures used for conducting the research. Basically it contains the following details:
- Sample
- Scales used
- Type of data collected

(7) **Results and findings:** The analysis of the data collected. It discusses the results and findings of the research.

(8) **Interpretation and Conclusion:** The interpretation and discussion of the findings of the data analysed. On basis of the interpretations, the results are concluded.

(9) **Limitations of the study or research:** The restrictions of limitations of the findings. It shows how and under which conditions the results can be generalised.

(10) **Recommendations and implications:** The researcher recommends suggestions and implications of the study conducted.

(11) **References:** The researcher acknowledges the authors, books, studies and journals which were helpful in providing relevant literature review for the research conducted.

(12) **Appendices:** The various sources (like questionnaire, company forms, case studies, data in tabular format, testimonials) which were analysed and used by the researcher.

Q10. Objectivity safeguards in research process.

Ans. This consists of (i) procedural safeguards (ii) standardisation (iii) operationalisation (iv) avoiding of bias.

Since subjectivity must be minimized in the data collection and analysis phases of scientific research, procedural safeguards are used to increase objectivity. These safeguards begin with keeping complete records of observations and data analyses in a form that other researchers can understand and evaluate. As a result, most scientific reports are written in a similar form and published by organisations of scientists. These reports communicate ideas to the entire scientific community and open those ideas to criticism. A second safeguard is standardisation. Standardisation means using uniform, consistent procedures in all phases of data collection. All subjects should receive the same instructions and be treated in the same way. By applying a standard treatment for all participants in the course of study, researchers ensure they will have the same basic experience. A third safeguard involves standardising the meaning of concepts, known as operationalisation. An operational definition of a concept defines that concept in terms of how it is measured or what operations produce it. Researchers must also safeguard objectivity by avoiding bias. As explained earlier, bias from external influences, personal beliefs, observers' perspectives, and human expectations can all

distort data. Researchers use various control procedures to avoid such biases and test hypotheses in ways that are fair and error-free.

Q11. Types of constructs.

Ans. As Mac-Corquodale & Meehl, (1948) Indicated that there are two types of constructs which are often employed by psychologist and behavioural scientist:

Intervening Variables: An intervening variable is construct which is utilised as a summary term for a group of other construct; It has no meaning apart from context in which it is utilised. As you know, Clark Hull, a behaviourist who proposed hypothetical deductive method of learning, utilised intervening variables in the formation of the learning theory. Hull defined reaction potential as the combination of habit strength and drive. Reaction potential is an intervening variable, since it only summarizes other constructs (habits strength and drive) and has meaning only in relation to them. An example of intervening variable is, hostility which is inferred from hostile and aggressive acts.

Hypothetical Constructs: In contrast, a hypothetical construct is a theoretical term which is employed to describe something "real." That is, it is an intermediary which has tangible characteristics. Habit strength, defined by Hull as the number of reinforced trials, is a hypothetical construct. As another example, the word "reflex" refers to certain readily observable characteristics. The patellar reflex or "knee jerk" occurs when a small force is sharply applied at the appropriate point on the knee. The term "reflex" refers t the chain of events that occurs within the organism after the application of the stimulus and before the response. Hence, reflex is a hypothetical construct.

As a further example, suppose an equation could be developed which would tell us how much a person knows:

$K = AC \times IQ$

Where:

K = knowledge AC = amount of conditioning IQ = intelligence

AC could be defined as the number of reinforced trials a person receives and IQ as that person's score on a standard intelligence test. K could be defined as being a function of AC and IQ. Therefore, AC and IQ are hypothetical constructs (they describe something real and are defined directly by the operations that established them or by which they were measured). On the other hand, K is an intervening variables (it has no meaning of its own, but only summarizes or stands for other constructs). However, if K were defined as the number of correct solutions a person achieved on the "knowledge test," then K would also be a hypothetical construct.

Q12. Quota Sampling.

Ans. Quota Sampling is an improvement over haphazard sampling. In quota sampling, a researcher first identifies relevant categories of people (e.g., male and female; or under age 30, ages 30 to 60, over age 60, etc.), then decides how many to get in each category. Thus, the number of people in various categories of the sample is fixed. For example, a researcher decides to select 5 males and 5 females under age 30, 10 males and 10 females aged 30 to 60, and 5 males and 5 females over age 60 for a 40-person sample. It is difficult to represent all population characteristics accurately.

Quota sampling ensures that some differences are in the sample. In haphazard sampling, all those interviewed might be of the same age, sex, or background. But, once the quota sampler fixes the categories and number of cases in each category, he or she uses haphazard or convenience sampling. Nothing prevents the researcher from selecting people who act friendly or who want to interviewed. Quota sampling methods are not appropriate when the interviewers choose who they like (within above criteria) and may therefore select those who are easiest to interview, so, sampling bias can take place. Because not using the random method, it is impossible to estimate the accuracy. Despite these limitations, quota sampling is a popular method among non-probability methods of sampling, because it enables the researcher to introduce a few controls into his research plan and this methods of sampling are more convenient and less costly then many other methods of sampling.

Q13. Advantages and disadvantages of survey research.

Ans. Advantages:
- It is convenient, less time taking and economical for the researcher.
- The survey can be conducted for a longer period of time, which gives a chance of knowing about the latest changes or advancements that might have taken place in the agenda under study
- The researcher gets a full chance to well organise and present the reasons of the study to get full and honest answers from the respondents.
- Yet, the method of survey research lacks the following aspects.

Disadvantages:
- Maintaining the privacy of responses of each respondent under a group interview is questionable and that may also restrict full and honest answers from them.
- High attrition rate of the respondents might hinder the longitudinal based studies.

Q14. Differences between Ex-post Facto and Experimental research.

Ans.

	Experimental research	**Ex-post facto research**
Control over independent Variable	In an experimental research, the researcher can directly manipulate the independent variable/s (that is, the cause) in order to examine its effect on the dependent variable (that is, the effect).	In an ex-post facto research, the researcher can not directly manipulate the independent variable/s (that is, the cause) as he or she predicts the cause on basis of the dependent variable (that is, the effect).
Principle of randomisation	The researcher can use the principle of randomisation in an experimental research on basis of which they can conclude or infer that other things remaining equal/ constant/controlled the effect is a result of manipulation of the cause.	The researcher can not use the principle of randomisation in an ex-post facto research as the researcher has no direct control over the cause and so they infer the possibilities of the causes on basis of the existing effect.
Manipulation of variables	The researcher can manipulate variables in an experimental research	The researcher can not manipulate variables in an ex-post facto research.
Interpretation	It is easier to interpret or infer relationships between the independent and dependent variables as they can manipulate the independent variable and see its effect on dependent variable	It is difficult to interpret or infer relationship between the independent and dependent variables as there can be more than one possibilities or cause for a particular effect.

Q15. Criteria for a good research design

Ans. For research design to be considered good, we must ask the following questions?
- Does the design give specific answer to the research question?
- Does the design adequately test the hypothesis?
- Does the design present the appropriate question/problem?
- Does the design adequately control the extraneous independent variable?
- Can we generalise the results of a study to other subjects?
- Does the design give the internal and external validity?

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Q-16. Quasi-experimental research design

Ans. Meaning of Quasi Experimental Design: The word quasi means 'as if' or 'to a degree'. Thus quasi experimental design is one that resembles an experiment but lacks at least one of its defining characteristics. According to Mcburney & White (2007) 'quasi experiment is a research procedure in which the scientist must select subjects for different conditions from pre-existing groups'. According to Broota (1989) "All such experimental situations in which the experimenter does not have full control over the assignment of experimental units randomly to the treatment conditions or the treatment cannot be manipulated are called quasi experimental design."

According to Singh (1998) "A quasi experimental design is one that applies an experimental interpretation to results that do not meet all the requirement of a true experiment." According to Wikipedia, The quasi experimental design are related to the setting up a particular type of an experiment or other study in which one has little or no control over the allocation of the treatment or other factors being studied. According to Shadish, Cook & Cambell (2002), "The term quasi experimental design refer to a type of research design that lacks the element of random assignment."

Q17. Advantages of correlational research design.

Ans. Advantages: The correlational designs are used in many cases because available data makes it easy to use. Some more careful researchers use the result of correlational studies to formulate new hypothesis which they can test later using more rigorous research design rather than test hypothesis about cause and effect directly.

Correlational design is used as the foundation for other designs that permit more certain causal inferences to be drawn from results.

It usually does not involve repeated administration of a behavioural measure, thus avoiding pretest sensitisation.

It usually uses very realistic measurements of behaviour and its possible causes as well.

Correlational research thus avoids the problem of non-representative research context. It also permits the use of large carefully chosen sample thus avoiding the threat of non-representative sample of participant.

Q18. Ethnography.

Ans. The method is also known as 'ethnomethodology' or 'methodology of people'. This type of research method basically intends to study culture through close observation and active participation. It focuses on studying socio cultural phenomena of a community. The ethnographer/ researcher collect information regarding the socio cultural phenomena from a lot of people belonging to the community under study.

On behalf of their community, the participants also identify and provide the researcher some more respondents as a representative of their community (also known as chaining process). The data is therefore collected using a chain sampling in all empirical areas of investigation. The selected samples are re- interviewed in order to elicit deeper and ambiguous responses. The ethnographer stays within the community for months in order to gain more information through chaining process and collect data in form of observational transcripts and interview recordings. The analysis of data leads to development of theories for the socio cultural phenomena under study, only on basis of the views and perspectives of its respondents.