

Q.1 What are Sources of Knowledge? Define scientific method and describe its different steps. (20)

Answer:-

SOURCES OF KNOWLEDGE:-

Knowledge is power if we know. But do we know the different sources of knowledge? As we are exploring about mind, its good to know about these different sources of knowledge. Inspiration, revelation, insight, intuition, ecstasy, divine sight and eternal bliss are the seven planes of knowledge. There are four sources of knowledge, viz., instinct, reason, intuition and super-intuition or Atma-Juana (Self Realization).

INSTINCT:-

When an ant crawls in your right arm, the left arm automatically moves towards the right arm to drive away the ant. The mind does not reason there. When you see a scorpion in front of your leg, you withdraw your leg automatically. This is termed instinctive or automatic movement. As you cross a street, how instinctively you move your body to save yourself from the cars! Instinct is found in animals and birds. In birds, the ego does not interfere with the free divine flow and divine play. Hence the work done by them through their instincts is more perfect than that done by human beings. Have you not noticed the excellent work done by birds in their building of wonderful nests?

REASON:- Reason is higher than instinct and is found only in human beings. It collects facts, generalizes, reasons out from cause to effect, from effect to cause, from premises to conclusions, from propositions to proofs. It concludes, decides and comes to judgment. It takes you safely to the door of intuition and leaves you there. Belief, reasoning, knowledge and faith are the four important psychic processes. First you have belief in a doctor. You go to him for diagnosis and treatment. He makes a thorough examination and then prescribes certain medicines. You take them. You reason out: Such and such is the disease. The doctor has given me Iron and Iodide. Iron will improve my blood. The Iodide will stimulate the lymphatics and absorb the exudation and growth in the liver. So I should take it. Then the disease is cured, by a course of these drugs, in a month. Then you get knowledge of and perfect faith in the efficacy of the medicine and the proficiency of the doctor. Then you recommend to your friends this doctor and his drugs.

INTUITION:-

Intuition is spiritual experience. Intuition is the immediate knowledge of the Absolute, obtained through the eye of wisdom, as opposed to the knowledge of the external objects derived through the exercise of the senses and the intellect. There is direct perception of truth or immediate knowledge. You know things by a flash. Intuition transcends reason, but does not contradict it. Intellect takes a man to the door of intuition and returns back. Spiritual flashes and glimpses of truth come through intuition. Inspiration, revelation, spiritual insight come through intuition. The mind and the senses require time and space to function, but the Reality which is beyond this temporal, spatial and causal order of things, can only be grasped and apprehended by intuition. Intuition is beyond relativity.

SELF REALIZATION:-

Self-realization (Atma-Jnana) means knowledge of the self or soul. The reason the term 'realization' is used instead of 'knowledge' is that jnana refers to knowledge of self based on experience, not mere intellectual knowledge." Atma-Jnana, literally "knowledge of the soul or supreme spirit". Atmadnana is above intuition. It is the highest form of Knowledge. It is the only Reality.

SCIENTIFIC METHOD:-

The scientific method is a process for experimentation that is used to explore observations and answer questions. Does this mean all scientists follow exactly this process? No. Some areas of science can be more easily tested than others. For example, scientists studying how stars change as they age or how dinosaurs digested their food cannot fast-forward a star's life by a million years or run medical exams on feeding dinosaurs to test their hypotheses. When direct experimentation is not possible, scientists modify the scientific method. In fact, there are probably as many versions of

the scientific method as there are scientists! But even when modified, the goal remains the same: to discover cause and effect relationships by asking questions, carefully gathering and examining the evidence, and seeing if all the available information can be combined in to a logical answer.

Even though we show the scientific method as a series of steps, keep in mind that new information or thinking might cause a scientist to back up and repeat steps at any point during the process. A process like the scientific method that involves such backing up and repeating is called an iterative process. Whether you are doing a science fair project, a classroom science activity, independent research, or any other hands-on science inquiry understanding the steps of the scientific method will help you focus your scientific question and work through your observations and data to answer the question as well as possible.

THE STEPS OF THE SCIENTIFIC METHOD:-

The steps of the scientific method were developed over millennia, since the time of the ancient Greek and Persian philosophers.

GENERAL QUESTION:-

The starting point of most new research is to formulate a general question about an area of research and begin the process of defining it. This initial question can be very broad, as the later research, observation and narrowing down will hone it into a testable hypothesis.



Eventually, the researcher will arrive at one fundamental hypothesis around which the experiment can be designed.

DESIGNING THE EXPERIMENT:-

This stage of the scientific method involves designing the steps that will test and evaluate the hypothesis, manipulating one or more variables to generate analyzable data. The experiment should be designed with later statistical tests in mind, by making sure that the experiment has controls and a large enough sample group to provide statistically valid results.

OBSERVATION:-

This is the midpoint of the steps of the scientific method and involves observing and recording the

results of the research, gathering the findings into raw data. The observation stage involves looking at what effect the manipulated variables have upon the subject, and recording the results.

ANALYSIS:- the scope of the research begins to broaden again, as statistical analyses are performed on the data, and it is organized into an understandable form. The answers given by this step allow the further widening of the research, revealing some trends and answers to the initial questions.

CONCLUSIONS AND PUBLISHING:- This stage is where, technically, the hypothesis is stated as proved or disproved. However, the bulk of research is never as clear-cut as that, and so it is necessary to filter the results and state what happened and why. This stage is where interesting results can be earmarked for further research and adaptation of the initial hypothesis.

Even if the hypothesis was incorrect, maybe the experiment had a flaw in its design or implementation. There may be trends that, whilst not statistically significant, lead to further research and refinement of the process.

The results are usually published and shared with the scientific community, allowing verification of the findings and allowing others to continue research into other areas.

CYCLES:- This is not the final stage of the steps of the scientific method, as it generates data and ideas to recycle into the first stage. The initial and wider research area can again be addressed, with this research one of the many individual pieces answering the whole question. Building up understanding of a large area of research, by gradually building up a picture, is the true path of scientific advancement. One great example is to look at the work of 1.1 Thomson, who gradually inched towards his ultimate answer.

Q.2 DISCUSS THE CONCEPT OF EDUCATIONAL RESEARCH. ALSO EXAMINE THE NEED AND IMPORTANCE OF RESEARCH IN EDUCATION. (20)

Answer: Concept of Educational Research: Educational research refers to a variety of methods, in which individuals evaluate different aspects of education including: "student learning, teaching methods, teacher training, and classroom dynamics".

Educational researchers have come to the consensus that educational research must be conducted in a rigorous and systematic way, although what this implies is often debated. There are a variety of disciplines which are each present to some degree in educational research. These include psychology, sociology, anthropology, and philosophy. The overlap in disciplines creates a broad range from which methodology can be drawn. The findings of educational research also need to be interpreted within the context in which they were discovered as they may not be applicable in every time or place.

THE NEED AND IMPORTANCE OF RESEARCH IN EDUCATION:- Finding reasons why research is important may seem like a no-brainer, but many would rather avoid getting involved in research. The lazy, if not mentally drained, student could say, "Not again." And a disinterested academic could just be doing it for promotion purposes. Yet, for those who like to learn -whether or not they are members of a learning institution – doing research is not just an imperative, but a need. What reasons could drive one to appreciate research and engage in doing it?

1. A TOOL FOR BUILDING KNOWLEDGE, EFFICIENT LEARNING, BUSINESS SUCCESS, AND JOB SEARCH:- Research is required not just for students and academics, but for all professionals. It is also important for budding and veteran writers, both offline and online. For those looking for a job, research is likewise a necessity.

Among professionals and scribes, finding an interesting topic to discuss and/or to write about should go beyond personal experience. Determining either what the general public may want to know about

or what researchers want others to realize or to think about can serve as a reason to do research. The Brain Research Trust acknowledges the importance of research. Undoubtedly, it is crucial to finding possible cures for diseases, as well as how to prevent them. Thus, research becomes a must to ascertain if one's ideas are supported by previous studies or if these ideas still need proof to be considered as knowledge. An example of this is the 2016 study of several psychologists who examined how sleep affects memory reactivation. In "Relearn Faster and Retain Longer: Along With Practice, Sleep Makes Perfect", they "found that interleaving sleep between learning sessions not only reduced the amount of practice needed by half but also ensured much better long-term retention. Sleeping after learning is definitely a good strategy, but sleeping between two learning sessions is a better strategy." This study supports the fact that: "Both repeated practice and sleep improve long-term retention of information". Their findings also emphasize how highly important sleep is to healthy brain function.

2. MEANS TO UNDERSTAND VARIOUS ISSUES:- Television shows and movies ooze with research – both on the part of the writer(s) and the actors. Though there are hosts who rely on their researchers, there are also those who exert effort to do their own research. This helps them get information that hired researchers missed, build a good rapport with the interviewee, and conduct a good interview in the process. For their part, some film and TV actors would take time to interview detectives, boxers, scientists, business people, criminals, and teachers, among others. Others would even immerse themselves in situations that would make them understand social and personal issues like living behind bars or in a drug rehabilitation center. Many would read literature, biographies, or journals to have a better view or context of the story.

As what Terry Freedman says in "The Importance of Research for ICT Teachers" (2011): "Research can shed light on issues we didn't even know existed, and can raise questions we hadn't realized even needed asking." Thus, almost all writers of imaginary and non-fictional tales also do research because doing so helps them create a good story and/or achieve strong credibility as an academic.

3. A WAY TO PROVE LIES AND TO SUPPORT TRUTHS:- Ever experienced feeling that your mate is having an affair behind your back? Some people would overlook that and say that it's better not to know; others though would take discreet action, hiring detectives to do the work. What does research have to do with that situation? A lot. Doing research to reveal lies or truths involving personal affairs contributes in either making a relationship work or in breaking away from a dysfunctional one. For the monogamous lot, doing research to disprove or prove infidelity is not simply a trust issue, but a right to find out the truth – unless one's intimate partner has already admitted being polyamorous even before the relationship started. When s/he dislikes answering relationship-related questions, including her/his whereabouts, it is better to see that as a red flag and take baby steps to save yourself from what could become a more serious emotional mess later. Scientists also deal with research to test the validity and reliability of their claims or those of other scientists'. Their integrity and competence depend on the quality – and not just quantity – of their research. Nonetheless, not everything scientists come up with get accepted or learned by everyone, especially when factors like religion, state suppression, and access to resources and social services (e.g., education and adequate health programs) either feed the poor majority with lies or deter them from knowing truths to preserve the status quo.

4. A SEED TO LOVE READING, WRITING, ANALYZING, AND SHARING VALUABLE INFORMATION:- Research entails both reading and writing. These two literacy functions help enable computation and comprehension. Without these skills, it is less likely for anyone to appreciate and get involved in research. Reading opens the mind to a vast horizon of knowledge, while writing helps a reader use her/his own perspective and transform this into a more concrete idea that s/he understands. Apart from reading and writing, listening and speaking are also integral in conducting research. Interviews, attending knowledge-generating events, and casual talks with anyone certainly aid in formulating research topics. They can also facilitate the critical thinking process. Listening to experts discuss the merits of their studies helps the listener to analyze a certain issue and write about such analysis.

With the wide array of ideas available, scholars and non-scholars involved in research are able to share information with a larger audience. Some view this process as ego-boosting, while others see

it as a means to stimulate interest and encourage further studies about certain issues or situations. As literacy is integral in improving a person's social and economic mobility and in increasing awareness, research then hones necessary basic life skills and makes learning a life-long endeavor.

5. NOURISHMENT AND EXERCISE FOR THE MIND:- Curiosity may kill not just the cat, but the human as well. Yet, it is the same curiosity that fuels the mind to seek for answers. The College Admissions Partners (n.d.) notes how scientific research in particular "helps students develop critical reasoning skills...helpful for any field of higher education..." Such search or the thinking process is food for the brain, allowing creativity and logic to remain active. It also helps prevent mental illnesses like Alzheimer's. Indeed, research and doing research encourage people to explore possibilities, to understand existing issues, and to disclose truths and fabricated ones. Without research, technological advancement and other developments could have remained a fantasy. Reading, writing, observing, analyzing, and interacting with others facilitate an inquisitive mind's quest for knowledge and efficient learning. Research serves as an instrument to achieve that goal.

Q.3 EXPLAIN DIFFERENT TYPES OF RESEARCH ON THE BASIS OF PURPOSE AND EXPLAIN THEM WITH SUITABLE EXAMPLE. (20)

ANSWER:-

Research is systematic way to find out facts and knowledge as Kothari (2006) has analyzed that research is the pursuit of truth with the help of study, observation, comparison and experiment; the search for knowledge through objective and systematic method of finding solutions to a problem. However there are two types of researches one is by Purpose and other is by method. The type by purpose falls into three categories such as Basic, Applied and Action Research.

BASIC RESEARCH:-

Basic research is mainly concerned with generalizations and the formulation of theory. It is driven by curiosity or interest in a subject. The main motivation is to expand man's knowledge, not to create or invent something. Many scientists believe that basic research lays the foundation for the applied research that follows.

STRENGTHS OF BASIC RESEARCH:

Therefore it has some merits and according to R. Stephen Berry (2011) basic research has following merits:-

1. Basic research is typically curiosity-driven and researchers develop their curiosity through their observations.
2. Basic research frequently leads to new insights into the essence of nature, the human mind, and the complex interactions between their elements.
3. It is usually unpredictable in terms of its course and outcomes.
4. It requires a special way of thinking that often combines seemingly unrelated facts and explores unknown fields necessary to make new discoveries. It is for this reason that basic research is frequently multidisciplinary in nature.
5. It is the verifiable which makes scientific knowledge a firmer kind of knowledge than anything else we have. This information includes not only data in databases, but also the information found in journals and textbooks, the interpretation of data, and the concepts that underlie these.

LIMITATIONS OF BASIC RESEARCH:-

It is limited in nature as it never helps to make discoveries, create or invent anything. But it just expands one's knowledge as it is a theoretical but not practical research.

APPLIED RESEARCH:- It involves practical problems of the society. It can be argued that the goal of applied research is to improve the human condition. An example of applied research could be a study to find out how the school feeding program has affected school enrollment rates in drought-prone districts. Applied research is increasingly gaining favor as it helps to address the problems facing the world today such as overpopulation, pollution, depletion of natural resources, drought, floods, declining moral standards and disease. As Anderson, G. J. (1998) also felt that researchers in this field try to find solutions to existing educational problems. The approach is much more utilitarian as it strives to find information that will directly influence practice.

STRENGTHS OF APPLIED RESEARCH:- It is designed to solve practical problems of the modern world, rather than to acquire knowledge for knowledge's sake and it is used to find solutions to everyday problems, cure illness, and develop innovative technologies.

ACTION RESEARCH:- It is a unique form of applied research and a reflective process of progressive problem solving. It is also called "practitioner research" because of the involvement of the actual practitioner in real life. Action implies that the practitioner is involved in the collection of data, analysis, and the interpretation of results. He or she is also involved in implementing results of the research and is thus well placed to judge the effectiveness of the interventions.

It is done simply by action, hence the name. It can also be undertaken by larger organizations or institutions, assisted or guided by professional researchers, with the aim of improving their strategies, practices, and knowledge of the environments within which they practice.

As (Reason & Bradbury, 2002) assessed that action research is an interactive inquiry process that balances problem solving actions implemented in a collaborative context with data-driven collaborative analysis or research to understand underlying causes enabling future predictions about personal and organizational change.

STRENGTHS OF ACTION RESEARCH:-

1. It is a practical way for individuals to explore the nature of their practice and to improve it.
2. Action research encourages practitioners to become knowledge-makers, rather than merely knowledge-users.
3. Action research proceeds through a process of planning, action and reflection upon action. This can be thought of as an action-reflection 'cycle'.

LIMITATIONS OF ACTION RESEARCH:-

1. Action researcher works in the hurly burly of her/his own practice. Monitoring closely, this practice as they act within it, demands space and time which, almost by definition, the practice does not give easily. It is therefore difficult to maintain rigor in data gathering and critique.
2. The process can be messy; as research proceeds, wider links are likely to be identified.
3. The result can't be generalize usually as C.F. Hamilton (1981) also noted that this is true, but someone else's ideas or conclusions can always be tried out by other persons in their own practice, to see if they work for them or not.

Q.4 DEFINE EXPERIMENTAL RESEARCH. WHAT IS DIFFERENT EXPERIMENTAL DESIGN USED IN AN EXPERIMENTAL RESEARCH? (20)

ANSWER:-

Experimental Research: Experimental research describes the process that a researcher undergoes of controlling certain variables and manipulating others to observe if the results of the experiment reflect that the manipulations directly caused the particular outcome. This type of research differs from a descriptive study, and another one of its important aspects is the use of random assignment. If you have decided that an experiment is the best approach to testing your hypothesis, then you need to design the experiment. Experimental design refers to how participants are allocated to the different conditions (or IV groups) in an experiment.

Probably the commonest way to design an experiment in psychology is to divide the participants into two groups, the experimental group and the control group, and then introduce a change to the experimental group and not the control group.

The researcher must decide how he/she will allocate their sample to these IVs. For example, if there are 10 participants, will all 10 participants take part in both conditions (e.g. repeated measures) or will the participants be split in half and take part in only one condition each?

THREE TYPES OF EXPERIMENTAL DESIGNS ARE COMMONLY USED:-

1. **INDEPENDENT MEASURES:-** Different participants are used in each condition of the independent variable. This means that each condition of the experiment includes a different group of participants. This should be done by random allocation, which ensures that each participant has an equal chance of being

assigned to one group or the other.

Independent measures involves using two separate groups of participants; one in each condition. For example:

PRO:- Avoids order effects (such as practice or fatigue) as people participate in one condition only. If a person is involved in several conditions they may become bored, tired and fed up by the time they come to the second condition, or becoming wise to the requirements of the experiment!

CON: More people are needed than with the repeated measures design (i.e. more time consuming).

CON:- Differences between participants in the groups may affect results, for example; variations in age, sex or social background. These differences are known as participant variables (i.e. a type of extraneous variable).

CONTROL:- After the participants have been recruited, they should be randomly assigned to their groups. This should ensure the groups are similar, on average (reducing participant variables).

2. REPEATED MEASURES:- The same participants take part in each condition of the independent variable. This means that each condition of the experiment includes the same group of participants.

PRO: Fewer people are needed as they take part in all conditions (i.e. saves time).

PRO: As the same participants are used in each condition, participant variables (i.e., individual differences) are reduced.

CON:- There may be order effects. Order effects refer to the order of the conditions having an effect on the participants' behavior. Performance in the second condition may be better because the participants know what to do (i.e. practice effect). Or their performance might be worse in the second condition because they are tired (i.e. fatigue effect). This limitation can be controlled using counterbalancing.

CONTROL:- To combat order effects the researcher counter balances the order of the conditions for the participants. Alternating the order in which participants perform in different conditions of an experiment.

COUNTERBALANCING:-

Suppose we used a repeated measures design in which all of the participants first learned words in 'loud noise' and then learned it in 'no noise'. We would expect the participants to show better learning in 'no noise' simply because of order effects, such as practice. However, a researcher can control for order effects using counterbalancing.

The sample would split into two groups experimental (A) and control (B). For example, group 1 does 'A' then 'B', group 2 does 'B' then 'A' this is to eliminate order effects. Although order effects occur for each participant, because they occur equally in both groups, they balance each other out in the results.

3. Matched Pairs:
Each condition uses different but similar participants. An effort is made to match the participants in each



condition in terms of any important characteristic which might affect performance, e.g. sex, age, intelligence etc. One member of each matched pair must be randomly assigned to the experimental group and the other to the control group.

IV = sleep	
1.	2.
2 hours sleep	10 hours sleep
Group A (10 students)	Group B (10 students, matched for age, gender, normal sleeping length)
DV Reaction Time	Reaction Time

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PRO: Reduces participant variables because the researcher has tried to pair up the participants so that each condition has people with similar abilities and characteristics.

PRO: Avoids order effects, and so counterbalancing is not necessary. Con: Very time-consuming trying to find closely matched pairs. Con: Impossible to match people exactly, unless identical twins!

CON: If one participant drops out you lose 2 PPs' data.

CONTROL: Members of each pair should be randomly assigned to conditions. However, this does not solve all these problems.

EXPERIMENTAL DESIGN SUMMARY:- Experimental design refers to how participants are allocated to the different conditions (or IV groups) in an experiment. There are three types:

1. Independent measures / groups:-

Different participants are used in each condition of the independent variable.

2. Repeated measures:

The same participants take part in each condition of the independent variable.

3. Matched pairs:-

Each condition uses different participants, but they are matched in terms of important characteristics, e.g. sex, age, intelligence etc.

Q.5 DEFINE DESCRIPTIVE RESEARCH, WHAT ARE ITS MAJOR FORMS? STRENGTHEN YOUR ANSWER WITH THE EXAMPLE OF CASE STUDIES, CAUSAL COMPARATIVE STUDIES AND CORRELATION STUDIES. (20)

ANSWER:-

Descriptive Research: Sometimes an individual wants to know something about a group of people.

Maybe the individual is a would-be senator and wants to know who they're representing or a surveyor who is looking to see if there is a need for a mental health program.

DESCRIPTIVE RESEARCH:- is a study designed to depict the participants in an accurate way. More simply put, descriptive research is all about describing people who take part in the study.

MAJOR FORMS OF DESCRIPTIVE RESEARCH:-

There are three main types of descriptive methods: observational methods, case-study methods and survey methods. This article will briefly describe each of these methods, their advantages, and their drawbacks. This may help you better understand research findings, whether reported in the mainstream media, or when reading a research study on your own.

OBSERVATIONAL METHOD:-

With the observational method (sometimes referred to as field observation) animal and human behavior is closely observed. There are two main categories of the observational method — naturalistic observation and laboratory observation. The biggest advantage of the naturalistic method of research is that

researchers view participants in their natural environments. This leads to greater ecological validity than laboratory observation, proponents say.

Ecological validity refers to the extent to which research can be used in real-life situations. Proponents of laboratory observation often suggest that due to more control in the laboratory, the results found when using laboratory observation are more meaningful than those obtained with naturalistic observation. Laboratory observations are usually less time-consuming and cheaper than naturalistic observations. Of course, both naturalistic and laboratory observation are important in regard to the advancement of scientific knowledge.

CASE STUDY METHOD:-

Case study research involves an in-depth study of an individual or group of individuals. Case studies often lead to testable hypotheses and allow us to study rare phenomena. Case studies should not be used to determine cause and effect, and they have limited use for making accurate predictions. There are two serious problems with case studies — expectancy effects and atypical individuals. Expectancy effects include the experimenter's underlying biases that might affect the actions taken while conducting research. These biases can lead to misrepresenting participants' descriptions. Describing atypical individuals may lead to poor generalizations and detract from external validity.

SURVEY METHOD:-

In survey method research, participants answer questions administered through interviews or questionnaires. After participants answer the questions, researchers describe the responses given. In order for the survey to be both reliable and valid it is important that the questions are constructed properly. Questions should be written so they are clear and easy to comprehend. Another consideration when designing questions is whether to include open-ended, closed-ended, partially open-ended, or rating-scale questions (for a detailed discussion refer to Jackson, 2009). Advantages and disadvantages can be found with each type:-

Open-ended questions allow for a greater variety of responses from participants but are difficult to analyze statistically because the data must be coded or reduced in some manner.

Closed-ended questions are easy to analyze statistically, but they seriously limit the responses that participants can give. Many researchers prefer to use a Likert-type scale because it's very easy to analyze statistically.