

Model Answers

M. Sc. 1st Semester Examination 2014

Rural Technology

AU-6290

RT-702 (Research Methodology)

Question ① Answer

Multipal choice questeins Answer

① (b) Research Methodology

② (d) All of These

③ (a) Research design

④ (b) Greek word

⑤ (a) Descriptive design

⑥ (a) Primary data

⑦ (c) Correlation

⑧ (A) Tabulation

⑨ (d) All of these

⑩ (d) Ratio level

Answer (2) Problem means anything deviating from normal process. The dictionary meaning of a problem is a question to be solved or decided.

Definition:

"The problem is an interrogative statement where in, it will answer the relationship between two more variables". A/c to Kerlinger

"A problem then is an interrogative sentence or statement that ask what relation exists between two or more variables." A/c to Hurlock

Criteria in selection of a Research Problem.

- The problem should be timely :-
- The Research problem should be related to practical as well as theoretical. :-
- The research problem should permit generalization. :-
- The research problem should help in developing new techniques :-
- The research problem should allow to study the relationship of phenomena :-
- Research problem should express relationship between two or more variables. :-
- Research problem should be stated clearly :-

Answer ③

Research design is a catalogue of the various phases and parts relating to the formulation of a research effort. It is the arrangement of conditions for the collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

"Research design is the plan, structure and strategy of investigations so as to obtain answers to research questions and control variance." *Atkinson*

Importance

- To provide answers to research questions :-
- To control variance :-
- To gain familiarity with the phenomena or to achieve new insight into it, often in order to formulate more precise research problem or to develop hypothesis :-
- To describe accurately the characteristics of individual situation or a group :-
- To determine frequency with which something occurs :-
- To test the hypothesis of causal relationship between the variables :-

Answer (A)

Science begins with observation and must ultimately return to observation for its final validation. Observation may take many forms and its the most primitive and the most modern of research techniques.

Kinds of Observations

- (1) Participant Observations: Participant observation is that one which is undertaken in circumstance which include the observer as a part of the things which he is observing.
Ex: An observer participation in farmer's group discussion.
- (2) Non participant Observations: In this type of observation the observer does not actually participate in the activities of the group, but simply observe them from a distance.
Ex: Exhibitions.
- (3) Controlled Observations: Controlled observation is generally carried on according to definite pre-arranged plans which may include considerable experimental procedure.
Ex: Extension teaching methods like field trip etc.
- (4) Non Controlled Observations: This involves observing the behaviour of the individual in uncontrolled situations i.e. natural situations. Ex: An observer watching a farmer's

Answer (5) Measurement is the assignment of numerals to objects or events, or symbols according to rules
A/c to Bredfield & Moredoek

Ordinal level of Measurement

In this level of measurement numbers are used to indicate the order of magnitude of the observation. It is also called as ranking measurement.

Ex: If there are 4 different types of fertilizers and if they are ordered on the basis of quality as...

Grade A, Grade B, Grade C & Grade D

- Ordinal scale only permit the ranking of items from highest to lowest.
- Ordinal level measurement have an absolute zero value and real difference between two value/Ranks may not to equal.
- The ordinal measurement includes not only the relation of equivalence (=) but also the relations "greater than (>) or less than (<).
- Statistical measurement used: Co-efficient of correlation.

Answer (6)

Principles are commonly followed in scientific writing

Flow: Readers interpret prose more easily when it flows smoothly, from background to rationale to conclusion. Don't force the reader to figure out your logic – clearly state the rationale. In addition, it is much easier on the reader if you explicitly state the logic behind any transitions from one idea to another.

Abbreviations: Use standard abbreviations (hr, min, sec, etc) instead of writing complete words. Some common abbreviations that do not require definition are shown on the attached table. Define all other abbreviations the first time they are used, then subsequently use the abbreviation [e.g. Ampicillin resistant (AmpR)]. As a general rule, do not use an abbreviation unless a term is used at least three times in the manuscript. With two exceptions (the degree symbol and percent symbol), a space should be left between numbers and the accompanying unit. In general, abbreviations should not be written in the plural form (e.g. 1 ml or 5 ml, not mls). S. Maloy 10/01

Past, present, and future tense: Results described in your paper should be described in past tense (you've done these experiments, but your results are not yet accepted "facts"). Results from published papers should be described in the present tense (based upon the assumption that published results are "facts"). Only experiments that you plan to do in the future should be described in the future tense.

Third vs first person: It is OK to use first person in scientific writing, but it should be used sparingly – reserve the use of first person for things that you want to emphasize that "you" uniquely did (i.e. not things that many others have done as well). Most text should be written in the third person to avoid sounding like an autobiographical account penned by a narcissistic author. However, it is better to say "It is possible to ..." than to say "One could ...". Writing that uses the impersonal pronoun "one" often seems noncommittal and dry. In addition, inanimate objects (like genes, proteins, etc) should be described in third person, not with anthropomorphic or possessive terms (e.g., instead of saying "its *att* site", say "the chromosomal *att* site").

Empty phrases: Avoid using phrases that do not contribute to understanding. For example, the following phrases could be shortened (or completely deleted) without altering the meaning of a sentence: "the fact that ..." (delete); "In order to ..." (shorten to simply "To ..."). Likewise, the title of a table of results does not benefit from the preface "Results of ...". In short, don't use more words than you need to make your point.

Specify: If several expressions modify the same word, they should be arranged so that it is explicit which word they modify. It is common to use a pronoun such as "it" or "they" to refer to a concept from the previous sentence. This is OK as long as there is only one concept that "it" or "they" means. However, if there are more than one concepts it is easy for the reader to get confused about what the pronoun is meant to specify (even if you know which one you mean). It is better to err on the side of redundancy by repeating the concept in subsequent sentences, than to take the chance of confusing the reader. Don't make the reader guess what you mean.

Parentheses: Avoid double parentheses. For example, "Three gene products catalyze reactions in the pathway for proline biosynthesis (Figure 1) (3)" could be reworded to say "Figure 1 shows the three reactions of the pathway for proline biosynthesis (3)."

Proofreading: Always spellcheck your paper and carefully proofread your paper before submission. In addition to checking for errors and typos, read your paper to yourself as if you were reading it out loud to ensure that the wording and sentence construction is not clumsy.

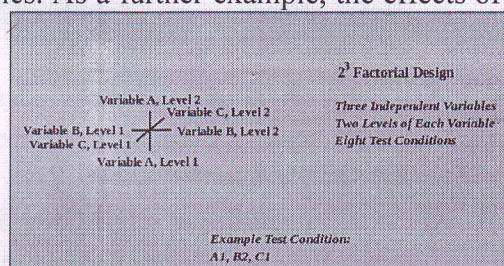
Answer (7)

A **factorial design** allows the investigator to study the effect of each factor on the response variable, as well as the effects of interactions between factors on the response variable. For the vast majority of factorial experiments, each factor has only two levels. For example, with two factors each taking two levels, a factorial experiment would have four treatment combinations in total, and is usually called a 2×2 factorial design.

If the number of combinations in a full factorial design is too high to be logistically feasible, a fractional factorial design may be done, in which some of the possible combinations (usually at least half) are omitted.

The simplest factorial experiment contains two levels for each of two factors. Suppose an engineer wishes to study the total power used by each of two different motors, A and B, running at each of two different speeds, 2000 or 3000 RPM. The factorial experiment would consist of four experimental units: motor A at 2000 RPM, motor B at 2000 RPM, motor A at 3000 RPM, and motor B at 3000 RPM. Each combination of a single level selected from every factor is present once. This experiment is an example of a 2^2 (or 2×2) factorial experiment, so named because it considers two levels (the base) for each of two factors (the power or superscript), producing $2^2=4$ factorial points.

Designs can involve many independent variables. As a further example, the effects of three input



variables can be evaluated in eight experimental conditions shown as the corners of a cube. This can be conducted with or without replication, depending on its intended purpose and available resources. It will provide the effects of the three independent variables on the dependent variable and possible interactions.

The factorial experiment can be analyzed using ANOVA or regression analysis.

Answer (B)

Research

Research is more systematic activity directed towards discovery and development of an organized body of knowledge. A/c to John Best

Research is a continuous cycle of scientific methods for finding solution of problems. A/c to Anonymous

Research methodology

Research methodology is a way to systematically solve the research problem. A/c to C.R. Kothari

Research methodology is a process in which various stages of analysis are employed to solve the research problem. A/c to Anonymous

Importance of Research

- Research is considered as the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct, or verify knowledge, whether the knowledge aids in construction of theory or in the practice of an art. It is a systematized effort to gain knowledge.
- Our knowledge is limited, and there are 'n' numbers of problems waiting to be solved in every subject. Be it science, mathematics, social science or law. We identify the vacuum in our knowledge and try to address it by asking relevant questions and seeking answers to it. Role of research is to provide a method for obtaining those answers by inquiringly studying the evidence within the parameters of the scientific method.
- Research is considered to be more objective, methodical, well-determined scientific process of investigation. Through research, a decision maker can quickly get a summary of current scenario,

which improves his information base for making sound decisions affecting future operations of organisation. It is useful to accelerate the decision making power and it alone can make possible the identification of the determinants.

- The aim of research is to seek answers to problems through the application of scientific methodology. Every research will have one aim. Its aim may be to find out the truth which is hidden and which is not been discovered so far.
- It is a media to find out the difference between two variables and to reach on certain specific conclusion.
- Importance of research varies according to its kind, especially whether it is basic or applied research.
 - Basic research aims to study or analyse advance knowledge with no application to existing problems in view.
 - Whereas, applied research is designed to solve a particular existing issue so that there are larger audience eager to support that research which is likely to solve problems of immediate concern.
- We do lot of things in our day to day life, and most of them are based on our common sense, or based on what we have learnt through personal experience or from others. Sometimes it is not the best approach and there are contrary theories about what works out best in a given situation. Hence, research is much needed.
- However, there are various reasons by which a research can happen; like, passion to know new things, due to job requirement etc. Most of the organizations hire some of their employees to conduct either Operational research which focus on on-going programs and business operations, or Strategic research which concentrates on the issues of a long-term goals and marketing strategies.
- Curiosity is a crucial part of the human condition. Many professionals, including scientists, want to know more about something that interests them. However, carefully organized and controlled research enables researchers to test and compare different theories and approaches, explore different methods and learn from other people's experience. It also enables them to rule out or at least consider external factors which might influence their results.
- Another major significance of carrying out a research is that, for lots of studies, the findings can be recorded numerically and then statistically analyzed in order to determine whether the findings are significant, i.e. the extent to which it can be claimed with a specified degree of certainty that they are not just due to chance.
- Disseminate research findings to create awareness of current situations and problem

To conclude, research is to finding out new things and asking questions we have about. Research allows you to pursue your interests, to learn something new, to hone your problem-solving skills and to challenge yourself in new ways. It allows you to come up with a result that represents the distillation of your interests and studies, and possibly, a real contribution to knowledge.

Answer (9) Generally, a research Report, whether it be called a dissertation or thesis, consists of three parts.

I The Preliminary Section

The preliminaries consist of the following components:

- (i) The title page.
- (ii) Preface including acknowledgements.
- (iii) Declaration
- (iv) Certificates
- (v) Table of contents
- (vi) List of Tables
- (vii) List of figures (and illustrations).
- (viii) List of abbreviations.

II The Text i.e. main body of the report.

The Text of a dissertation/thesis consists of the following sections:

- (i) Introduction
- (ii) Review of literature
- (iii) Methodology
- (iv) Result and discussion
- (v) Conclusion (Summary, Recommendations/suggestions).

III Reference Material

The reference material is generally divided as follows:

- (i) Bibliography
- (ii) Appendix (s)
- (iii) Glossary

Answer (10)

Scientific research is a systematic, empirical, controlled and critical investigation of hypothetical propositions about presumed relations among the natural phenomena.

A scientific research means an investigation carried out in the field of any science comes under scientific research.

Steps in scientific inquiry:

- ① Selection and formulation of the research problem and hypothesis :-
- ② Formulation and application of method of data collection :-
- ③ Classification and interpretation :-
- ④ Generalization and formulation of law :-

~~Answer (11)~~

Questionnaire

Questionnaire is one of the instruments (or) tools used for collecting data from the respondents. Questionnaire is yet the most flexible tools which possess advantage in collecting both quantitative and qualitative information. It serves two major purposes.

First it must translate the research objective into specific questions. The answer to which will provide the data necessary to test the hypothesis to explore ~~data~~ the area set by the research objective objective.

The second purpose of the questionnaire is to assist the interviewer in motivating the respondents communicate the required information. It is constructed on the basis of objectives.

Definitions of Questionnaire :

Questionnaire refers to a device for securing answers to questions by using a form which the respondent fills in himself.

Mc to Guide & Hult
Questionnaire is a form containing sequentially arranged questions which is generally made to the respondent who fills it up and returns it to the sender.

Mc to Anonymous

Advantages of Questionnaire

- (i) It is a less expensive procedure.
- (ii) It covers larger area : Nation, state etc.
- (iii) It requires much less skill to administer than all other interview.
- (iv) Questionnaires are often simply mailed or handed over to respondents with minimum explanation.
- (v) A research project can be completed by a single person, without the assistance of any field investigators.
- (vi) It is a ^{time} saving device compared to other method.
e.g. If the researcher mails the questionnaire respondents can return the replies within a week.
- (vii) The respondents may have greater confidence in their ^{अज्ञात} anonymity, and thus feel free to express views.
- (viii) It places less pressure on the subject for immediate response, when the subject is given sample time for filling out the questionnaire he can consider each point carefully.

Disadvantages/Limitation of Questionnaire

- (1) Only literate people can answer
- (2) Limited information
- (3) It is rigid not flexible.
- (4) Absence of investigator leads to creeping in the doubts.
- (5) Consulting other for some doubts.
- (6) Low percentage of response.
- (7) The data collected some times contains bias.
- (8) Observational data is lacking.