

RESEARCH METHODOLOGY (MBA 023)
M.B.A. 2ND SEMESTER

- Q1. Define research and examine its characteristics.
- Q2. Explain the steps in the exploratory study.
- Q3. Explain steps involved in research process.
- Q4. Describe importance of primary sources of data.
- Q5. Describe the different types of research, clearly pointing out the difference between an experiment and a survey
- Q6. write a lucid note on 'Research Design'
- Q7. What is probability sampling? Give examples.
- Q8. Explain the nature and purpose of a 'questionnaire' used for research studies. How will you design A questionnaire for conducting a market survey?
- Q9. Distinguish between primary data and secondary data and enlist the important method of collecting Primary data.
- Q10. Sketch out the precautions that must be taken while drafting a questionnaire.
- Q11. What is Sampling? Distinguish between the probability samplings and explain their significance.
- Q12. What are the different approaches to interview as a method of data collection? Explain their Relative merits and demerits.
- Q13. Differentiate between internal and external secondary data . What are the advantages and Disadvantages of secondary data?
- Q14. What are the various Kinds of charts and diagrams which are used in data analysis? Distinguish Between line chart, bar chart and histogram.
- Q15. Describe the following parts of report: Title page, table of contents, executive summary, problem definition , research design, data analysis , conclusions and recommendations.
- Q16. Describe the guidelines for report writing. What is a pie chart? For what types of information , is it suitable ? For what type of information is it not suitable?
- Q17. What is the difference between primary and secondary data? Why is it important to obtain Secondary data before primary data?
- Q18. What is research design? Why is it necessary for conducting a study ? How do exploratory, Descriptive and casual studies differ from each other ? Explain with examples.
- Q19. Describe the steps involved in research process with suitable illustration.
- Q20. How researchers evaluate secondary data? What types of secondary data does the Bureau of census reports make available?
- Q21. Explain the nature and purpose of a 'questionnaire ' used for research studies . How will you design a questionnaire for conducting a market survey?
- Q22. Write a lucid note on 'sampling procedure'.
- Q23 Discuss the role played by bibliography in context of research report.
- Q24. What are the characteristics of a research report? What functions does this report perform?
- Q25. Steps involved in testing of hypothesis.
- Q26. What do you mean by research? Explain its significance in modern times.
- Q27. "Empirical research in India in particular creates so many problems for researchers". State the

Problems that are usually faced by researchers.

Q28. "Research is much concerned with proper fact finding, analysis and evaluation." Do you agree with This statement? Give reasons in support of your answer.

Q29. Explain the meaning and significance of a research design.

Q30. "Research design in exploratory studies must be flexible but in descriptive studies, it must Minimize bias and maximize reliability." Discuss.

Q31. Give your understanding of a good research design. Is single research design suitable in all research studies? If not, why?

Q32. Define Research What are the possible motivations for conducting Research?

Q33. What are the characteristics of research? Explain the relationship between scientific method and Research.

Q34. Describe the research process in details.

Q35. Write a short note on "Significance of Research".

Q36. Define Research Design. What are the characteristics of a good research design?

Q37. Differentiate between exploratory research and descriptive research.

Q38. Research conducted to identify the characteristics of a group is termed as:

- (a) exploratory research
- (b) descriptive research
- (c) diagnostic research
- (d) experimental research

Q39. Which of the following is not a principle of experimental design:

- (a) principle of replication
- (b) principle of randomization
- (c) principle of local control
- (d) principle of validity

Q40. Difference between

- (a) Population and universe

Q41. Compare census survey and sample survey. Under what conditions is a sample preferred to a Census?

Q42. What is the difference between probability and non-probability sampling?

Q43. Briefly explain the following terms:

- (a) Sampling frame
- (b) Sampling unit

Q44. What are the various objectives of doing research?

Q45. What is the significance of research?

Q46. Briefly describe problems of researchers.

Q47. What are the various applications of research in different fields of management?

Q48. What are the steps involved in research process? Explain them.

Q49. Briefly enlist various steps in research process.

Q50. Briefly mention sources of existing literature.

Q51. Define research design.

- Q52. List the major components of a research design.
- Q53. Define the following terms
- (a) Population
 - (b) Sample
- Q54. What are the various types of non-probability sampling techniques?
- Q55. Define the following terms
- (a) Primary data
 - (b) Secondary data
- Q56. Differentiate between primary and secondary data..
- Q57. Discuss the purpose of research.
- Q58. How does research aid planning?
- Q59. Distinguish between
- (a) Pure research and applied research
 - (b) Exploratory and Diagnostic studies
 - (c) Descriptive study and analytical study
 - (d) Descriptive and diagnostic studies
- Q60. Define 'experimental research, and discuss its features.
- Q61. What are the steps involved in research process?
- Q62. What kinds of literature should a researcher review and for what purpose?
- Q63. What is a research design? Is it a specific plan like a building plan?
- Q64. How is a research design prepared?
- Q65. What are the contents of a research plan?
- Q66. Select a research problem and prepare a research design for its study.
- Q67. What are the characteristics of a good sample?
- Q68. How would you select a sample of 150 students out of 3500 graduate students in a university?
- Q69. What is convenience sampling? What are its limitations?
- Q70. Differentiate primary sources of data from secondary sources.
- Q71. Define research and examine its characteristics.
- Q72. Explain the steps in the exploratory study.
- Q73. What is bibliography? What is its purpose?
- Q74. Discuss the use of S.P.S.S. in research.
- Q75. What are the different approaches to research? Explain in brief stating their relative merits and demerits.
- Q76. Describe the different types of research, clearly pointing out the difference between an experiment and a survey
- Q77. Differentiate between questionnaire and schedule.
- Q78. What is sample size? How it is determined?
- Q79. Why tabulation and analysis is considered essential in a research study? Narrate the characteristics of a good table.
- Q80. Enumerate briefly the mechanism of report writing and underline the precaution to be taken at the time of report writing.

Q81. What are the characteristics of a research report? What functions does this report perform?

Q82. What is an Annexure in report? What is its purpose?

Q83. Write notes on following:

- (a) Two way ANOVA
- (b) Testing of hypothesis
- (c) Simple Random Sampling
- (d) Types of Business problems encountered by the research

Q84. Distinguish between the exploratory and descriptive research design with help of examples.

Q85. Differentiate between internal and external secondary data. What are the advantages and disadvantages of secondary data?

Q86. What principles should be followed for designing an ideal questionnaire?

Q87. Distinguish between primary data secondary data and enlist the important methods of collecting primary data.

Q88. What is Sampling? Distinguish between Probability and Non-Probability samplings and explain their significance.

Q89. What is Sampling? Distinguish between the probability samplings and explain their significance.

Q90. What is the difference between primary and secondary data? Why is it important to obtain Secondary data before primary data?

Q91. What is research design? Why is it necessary for conducting a study ? How do exploratory, Descriptive and casual studies differ from each other ? Explain with examples

Q92. "Research design in exploratory studies must be flexible but in descriptive studies, it must minimize bias and maximize reliability." Discuss.

Q93. Give your understanding of a good research design. Is single research design suitable in all research Studies? If not , why? What are the characteristic of research ?

Q94. Differentiate between primary and secondary data.

Q95. Define 'experimental research, and discuss its features.

Q96. What are the various kinds of charts and diagrams which are used in data analysis? Distinguish between line chart, bar chart, and histogram.

Q97. Describe the following parts of a report:

- (a) Title page
- (b) Table of contents
- (c) Executive summary
- (d) Problem definition
- (e) Research design
- (f) Data analysis
- (g) Conclusions and recommendations

Q98. Describe the guideline for report writing. What is a pie chart? For what type of information, is it suitable? For what type of information is it not suitable.

Q99. Describe the process of report preparation .Discuss the importance of objectivity in writing a marketing research report.

Q100. Describe the guideline for report writing. What guideline should be followed in an oral presentation?

Solution :

Q1. Define research and examine its characteristics.

Research means a search for facts- answers to questions and solutions to problems. It is a purposive investigation. It is an “organized inquiry.” It seeks to find explanations to unexplained phenomenon, to clarify the doubtful propositions and to correct the misconceived facts.

Kerlinger defines research as a “systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among the natural phenomenon.”

Characteristics of Research:

- Research is a systematic and critical investigation into phenomenon.
- It adopts scientific method i.e. based on observable experience or empirical evidence.
- Research is directed towards finding answers to the pertinent questions and solutions to problems.
- It emphasizes the development of generalization, principles or theories.
- It is not mere compilation but a purposive investigation.
- It aims at describing, interpreting and explaining a phenomenon.
- It is objective and logical. It applies possible tests to validate the measuring tools and the conclusions obtained.

Q2. Explain the steps in the exploratory study.

Exploratory research is preliminary study of an unfamiliar problem about which the researcher has little or no knowledge. It is similar to a doctor’s initial investigation of a patient suffering from unfamiliar malady for getting some clues for identifying it. It is ill-structured and much focused on the predetermined objectives. It usually takes the form of a pilot study. It is a separate type of research. It is appropriate to consider or contributes a three stage process :

Exploration the phenomenon

Description of the phenomenon

Experimentation the relationship among the related variables.

Q3. Explain steps involved in research process.

The major steps in research are as follows:

Formulation of the Research Problem: This is the first stage of the research process. In this stage the researcher single out or identified the problem he wants to study. It means that he must decide the general areas of interest or aspects of a subject-matter that he would like to inquire. Essentially two steps are involved in formulating the research problem:

- Understanding the problem theoretically
- Rephrasing the same into analytical terms from an analytical point of view.

Understanding the problem is to discuss it with one's own colleagues or those having expertise in the matter. In an academic institutions the researcher can seek the help from a guide who is usually an experienced person and has several research problems in mind. The guide puts forth the problem in general terms and it is up to the researcher to narrow it down and phase the problem in operational terms.

Extensive Literature Survey(Review): At this stage the researcher should undertake extensive literature survey connected with the problem. For this purpose the abstracting and indexing journals and published or unpublished bibliographies are first place to go i.e. Academic journals, books, research reports, Government reports etc., It should be remember that one source will lead to another.

Development of Working Hypothesis: In this stage researcher state in clear terms the working hypothesis or hypothesis. Working hypothesis is tentative assumptions made in order to draw out and test its logical or empirical consequences. Hypothesis should be very specific, clear and limited to the piece of research in hand because it has to be tested.

Preparing the Research Design: In this stage the researcher prepare a research design i.e. conceptual structure of the within which research would be conducted. It contains:

- Methodology of the research work
- Sampling plan
- Tools of gathering data
- Geographical area is to covered
- Scope of the study
- Operational definition of the study
- Conceptual model of study
- Reference period
- Budget

Determination of Sampling Design : In this stage researcher decide the way of selecting a sample which is popularly known as sample design. It is a defined plan determined before any data are actually collected for obtaining a sample from a given population. Samples can be either probability samples or non-probability samples. With probability samples each element has known probability of being included in the sample but the non-probability samples do not allow the researcher to determine the probability.

Collection of Data : In this stage the researcher collect data. Data can be collected from several ways i.e. survey , observation, interview and experiment etc. the researcher should select one method of data collection taking into consideration the nature of the investigation, objectives and scope of the inquiry, financial resources, available time and desired degree of accuracy.

Analysis of Data: The analysis of data requires a number of closely related operations such as establishment of categories, the application to these categories to raw data through coding, tabulation and then drawing statistical inferences. The researcher classify the raw data into some purposeful and usable categories. Coding operation is usually done at this stage through which the categories of data are transformed into symbols that may be tabulated and counted. Editing is the procedure that improves the quality of the data for coding. Tabulation is a part of the technical procedure wherein

classified data are put in the form of tables. Analysis work after tabulation is generally based on computation of various coefficients, measures used to obtain results.

Hypothesis –Testing: The hypothesis may be tested through the use of one or more tests such as chi-square test, t-test, F-test depending upon the nature and objectives of the research inquiry. Hypothesis testing will result in either accepting the hypothesis or in rejecting it.

Generalization and Interpretation: In this stage the researcher arrives at generalization i.e. to build a theory. As a matter of fact the real value of research lies in its ability to arrive at certain generalizations.

Preparation of the Research Report: Finally, the researcher has to prepare the report of what has been done by him. Writing of report must be done with great care keeping in view the following:

- Preliminary Body
- The Main Text
- The End Matter

Preliminary Body: It contains:

- Title page
- Researcher's declaration
- The certificate of the research supervisor
- Acknowledgement
- Table of contents List of tables
- List of graphs and charts

Main Text:

▪ **Introduction:**

- (i) Theoretical background of the topic
- (ii) Statement of the problem
- (iii) Review of literature
- (iv) The scope of the study
- (v) The objectives of the study
- (vi) Hypothesis to be tested
- (vii) Definition of the concepts
- (viii) Model if any

The design of the study:

- (i) Methodology
- (ii) Sources of data
- (iii) Sampling plan
- (iv) Data collection instrument
- (v) Field work
- (vi) Data processing and analysis

Q5. Describe the different types of research, clearly pointing out the difference between an experiment and a survey

- ❖ **Descriptive Research:** Descriptive research is a fact-finding investigation with adequate interpretation. It is more specific as it focus on the particular aspects or dimension of the problem studied. It is designed to gather descriptive information. The main purpose of the descriptive research is the description of the state of affairs as it exists at present . The main characteristics of the descriptive research is that the researcher has no control over the variables; he can only report what has happened or what is happening . The data are collected by using one or more appropriate methods i.e. observation, interview, and questionnaire.
- ❖ **Exploratory Research:** Exploratory research is preliminary study of an unfamiliar problem about which the researcher has little or no knowledge. It is similar to a doctor's initial investigation of a patient suffering from unfamiliar malady for getting some clues for identifying it. It is ill-structured and much focused on the predetermined objectives . It usually takes the form of a pilot study. It is the separate type of research , it is appropriate to consider or contributes a three stage process of exploration , description and experimentation. The purpose of an exploratory study may be:

To generate new ideas

- To increase the researcher's familiarity with the problem
- To gather information for clarifying concepts
- An exploratory research does not aim at testing hypothesis but it just attempts to see what is there rather than to predict the relationships that will be founded.
- ❖ **Applied Research:** Applied research is carried on to find solution to a real life problem requiring an action or policy decision . It is thus problem-oriented and action directed. It seeks an immediate and practical results i.e. marketing research is carried on for studying the post-purchase experience of the consumers. It is aiming at finding a solution for an immediate problem facing by a society, an industrial or business organization i.e. moral degradation, product failure, decrease/reduction in market shares.
- ❖ **Fundamental Research:** Fundamental research is mainly concerned with generalization and formulation of a theory. It is also known as 'Pure research'. It aims at extension of the knowledge . It may leads to either discovery of a new theory or refinement of an existing theory. The findings of pure or fundamental research enrich the storehouse of knowledge.
- ❖ **Analytical Research :** Analytical study is the system of procedures and techniques of analysis applied to quantitative data. The researchers has to use facts or information already available and analyze these to make a critical evaluation of the materials or topic. It may consist of a system of mathematical models or statistical techniques applicable to numerical data. This is also known as 'statistical research or method'. This study aims at testing hypothesis and specifying, interpreting relationships. It is used or concentrates on analyzing data in depth and examining relationship from various angles by bringing in as many relevant variables as possible in the analysis plan.
- ❖ **Diagnostic Research:** Diagnostic research is directed towards discovering what is happening , why it is happening and what can be done about it. It aims at identifying the causes of a problem and three possible solutions for it . It is more directly concerned with causal relationship and implications for action.

- ❖ **Experimental Research:** Experimental research is designed to assess the effects of particular variables on a phenomenon by keeping the other variables constant or controlled. It aims at determining whether and in what manner variables are related to each other. The factor, which is influenced by other factor is called 'dependent variable' and the other factors, which influence it, are known as 'independent variables'. For example, agricultural productivity i.e. crop yield per hectare is a dependent variable and factors such as soil fertility, irrigation, quality of seeds, measuring practices which influence the yield are independent variables. The nature of relationship between independent variables and dependent variables is perceived and stated in form of causal hypothesis. A closely controlled procedure is adopted to test them.
- ❖ **Quantitative Research:** Quantitative research is based on the measuring of quantity or amount. It is applicable to phenomenon that can be expressed in the terms of quantity.
- ❖ **Qualitative Research:** Qualitative research is concerned with qualitative phenomenon i.e. phenomenon relating to the quality. For example, motivation research, opinion research. Qualitative research is specifically important in the behavioural sciences where the aim is to discover the underlying motives of human behaviour.

Q6. Write a lucid note on 'Research Design'

Research design is a logical and systematic plan prepared for directing a research study. It is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. Research design is a conceptual structure within which research is conducted. It contribute the blue print for the collection, measurement and analysis of data. It describes:

- What is the study about?
- Why is the study being made?
- Where will the study be carried out?
- What type of data is required?
- Where can be required data be found?
- What periods of time will the study include?
- What will be the sample design?
- What techniques of the collection will be used?
- How will the data be analyzed?
- In what style will the report be prepared?
- What is the cost involved?

Contents of Research Design : The research design of a research contain the following sections:

- ❖ **Introduction:** The introduction of a research design resign should place the problem in its historical perspective, state the need for studying aims, researcher's precise interest in the study of the problem.
- ❖ **Statement of the Problem:** The research problem should be well defined, pointing out its core nature and its importance. The issue relating to the problem may also be stated. The statement gives direction to the research process.

- ❖ **Review of Literature:** A review of literature will bring out information the previous studies. The salient features of those studies may be briefly described and gaps may be pointed out.
- ❖ **Scope of the Study:** The scope and dimensions of the study should be delimited with reference to the topical scope-breadth, depth, geographical area to be covered, reference period, type of instructions/ respondents to be studied etc. The purpose of this demarcation is to make the study meaningful and manageable in terms of research aims, interest, competence available techniques.
- ❖ **Objectives of the Study:** The objectives of the study should be clearly stated. There refers to the questions to which the researcher proposes to seek answers through the study.
- ❖ **Conceptual Model:** This section is the heart of the research design. This is where researcher formulates and develops the structure of relationship among the variables he is investigating. The logical connection of the variables is delineated, the assumptions, propositions used to develop exploratory framework of the study.
- ❖ **Hypothesis:** These refers to the anticipated outcome or possible answers to the research questions. They should be conceptually clear, specific and simple.
- ❖ **The Significance of the Study:** It is important to point out the relevance and significance of the study/ investigation. What would be the value of the study for policy formulation, theory or practice? Can the findings contribute to the enrichment of the theory or solutions to the problem?
- ❖ **Geographical area to be Covered:** The territorial area to be covered by the study, should be decided and specified in the research plan. The area to chosen depends on the purpose of the study, time and other resources available.
- ❖ **Methodology:** In this section the overall typology of the design –experimental, descriptive, case study or historical study is specified. Further methods to be adopted for collection of the data i.e. observation, interview, questionnaire are specified.
- ❖ **Sampling Plan:** The study require collection of the primary data from the field, the universe (population) must be identified and methods of sampling to be used for drawing the sample from the universe.
- ❖ **Tools for gathering the Data:** In this section the tools i.e. questionnaire, interview schedule, check list to be used for gathering data should be described. The tools chosen to be appropriate to the methods to be adopted for gathering data.
- ❖ **Chapter Scheme:** the chapter scheme of the report to be prepared for communicating the findings of the study the academic and business community.
- ❖ **Time period:** The time period required for each stage of work and total time duration of the study should be specified.
- ❖ **Financial Budget:** This should include as estimated of the expected costs of the research project under various major categories such as salary, printing, stationary, postages, travel expenses, computation, typing etc.

Q10. Sketch out the precautions that must be taken while drafting a questionnaire.

A questionnaire is formal set of questions or statements designed to gather information from respondents that will accomplish the goals of the research project. Questionnaires measure people's attitudes, behavior and feelings toward just about everything.

■ Factors to be looked into while framing questionnaires:

1.Shared Vocabulary:

Interactive language to be kept simple & understandable

Highly technical language should be avoided as much as possible

Words used should not be ambiguous or vague.

- Example: Vague: How satisfied are you with Sterling Resorts?
- Better: How satisfied are you with the hospitality at Sterling Resorts?

2. Unsupported Assumptions:

Assumptions should be explicitly stated not implied.

Unsupported assumptions lead to exaggerated estimates.

3. Frame of Reference:

A single word can have several connotations under different situations.

The frame of desirability should be made clear.

Example: capacity may be connoted differently by an industrialist & an educator.

4.Biased Wording :

Biased Wording should be avoided.

Awareness of desirable response leads to shift of focus from actual response.

Example:

Biased: Do you think TV has negative effect on children?

Unbiased: What are your views on the effect of TV on children?

5.Adequate Alternatives:

Every question should have ample number of alternatives.

They should be explicit rather than being implicit.

Example: Do you prefer eating in restaurants?

Which do you prefer eating in restaurants or eating at home.

6.Double barreled questions:

A single question that asks for two responses.

Interpretation of the responses not effective.

Example: Do you believe most Japanese automobiles are comfortable and worth their price?

7.Positively & negatively worded questions:

Respondents are often guided by the directions of the questions.
Responses are different when surveys are either exclusively positive or negative.
Combination of both is desirable.

8.Generalizations & Estimates :

Proper structuring of questions to avoid generalizations.

Answers which require calculations should be avoided.

Example: How many times have sales promotion influenced you to switch brands over the last one year?

Better: How many times in the last month have sales promotion influenced you to switch brands?

Q12. What are the different approaches to interview as a method of data collection? Explain their relative merits and demerits.

The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. This method can be used through :

1. Personal interviews and, if possible, through
2. Telephone interviews

1.Personal Interview: This method requires a person known as the interviewer asking questions generally in a face to face contact to the other person or persons. This sort of interview may be in the form of direct personal investigation or it may be indirect oral investigation. Former method is suitable for extensive investigations. Latter method is used by the commissions and committees appointed by government to carry on investigations.

Advantages:

- More information and that too in greater depth can be obtained
- Interviewer by his own skill can overcome the resistance if any
- There is a greater flexibility in this method
- Personal information can as well be obtained easily

Disadvantages:

- It is very expensive method
- There remains the possibility of the bias of the interviewer
- This method is relatively more time consuming
- The presence of the interviewer on the spot may over – stimulate the respondent

2. Telephone interview: This method of collecting information consists in contacting respondents on telephone itself. It is not very widely used method, but plays important part in industrial survey. This method of data collection is quite popular, particularly in case of big enquiries. It is being adopted by the private individuals, research workers, private and public organisations and even by governments. In this

method a questionnaire is sent to the persons concerned with the request to answer the questions and return the questionnaire

Advantages:

- Flexible compare to mailing method
- Faster than other methods
- Cheaper than personal interview method
- Callbacks are simple and economical also
- High response than mailing method
- Replies can be recorded without embarrassment to respondents
- Interviewer can explain requirements more easily
- No field staff is required
- Wider distribution of sample is possible

Disadvantages:

- Little time is given to respondents
- Survey is restricted to respondents who have telephones
- Not suitable for intensive survey where comprehensive answers are required
- Bias information may be more
- Very difficult to make questionnaire because it should short and to the point

Q14. What are the various Kinds of charts and diagrams which are used in data analysis? Distinguish Between line chart, bar chart and histogram.

Graphs are pictorial representations of the relationships between two (or more) variables and are an important part of descriptive statistics. Different types of graphs can be used for illustration purposes depending on the type of variable (nominal, ordinal, or interval) and the issues of interest. The various types of graphs are :

Line Graph: Line graphs use a single line to connect plotted points of interval and, at times, nominal data. Since they are most commonly used to visually represent trends over time, they are sometimes referred to as time-series charts.

Advantages - Line graphs can:

- clarify patterns and trends over time better than most other graphs
- be visually simpler than bar graphs or histograms
- summarize a large data set in visual form
- become more smooth as data points and categories are added
- be easily understood due to widespread use in business and the media
- require minimal additional written or verbal explanation

Disadvantages - Line graphs can:

- be inadequate to describe the attribute, behavior, or condition of interest
- fail to reveal key assumptions, norms, or causes in the data
- be easily manipulated to yield false impressions
- reveal little about key descriptive statistics, skew, or kurtosis
- fail to provide a check of the accuracy or reasonableness of calculations

Bar graphs are commonly used to show the number or proportion of nominal or ordinal data which possess a particular attribute. They depict the frequency of each category of data points as a bar rising vertically from the horizontal axis. Bar graphs most often represent the number of observations in a given category, such as the number of people in a sample falling into a given income or ethnic group. They can be used to show the proportion of such data points, but the pie chart is more commonly used for this purpose. Bar graphs are especially good for showing how nominal data change over time.

Advantages - Bar graphs can:

- show each nominal or ordinal category in a frequency distribution
- display relative numbers or proportions of multiple categories
- summarize a large data set in visual form
- clarify trends better than do tables or arrays
- estimate key values at a glance
- permit a visual check of the accuracy and reasonableness of calculations
- be easily understood due to widespread use in business and the media

Disadvantages - Bar graphs can:

- require additional written or verbal explanation
- be easily manipulated to yield false impressions
- be inadequate to describe the attribute, behavior, or condition of interest
- fail to reveal key assumptions, norms, causes, effects, or patterns

Histograms are the preferred method for graphing grouped interval data. They depict the number or proportion of data points falling into a given class. For example, a histogram would be appropriate for depicting the number of people in a sample aged 18-35, 36-60, and over 65. While both bar graphs and histograms use bars rising vertically from the horizontal axis, histograms depict continuous classes of data rather than the discrete categories found in bar charts. Thus, there should be no space between the bars of a histogram.

Advantages - Histograms can:

- begin to show the central tendency and dispersion of a data set
- closely resemble the bell curve if sufficient data and classes are used
- show each interval in the frequency distribution
- summarize a large data set in visual form
- clarify trends better than do tables or arrays
- estimate key values at a glance
- permit a visual check of the accuracy and reasonableness of calculations
- be easily understood due to widespread use in business and the media
- use bars whose areas reflect the proportion of data points in each class

Disadvantages - Histograms can:

- require additional written or verbal explanation
- be easily manipulated to yield false impressions
- be inadequate to describe the attribute, behavior, or condition of interest
- fail to reveal key assumptions, norms, causes, effects, or pattern

Q16. Describe the guidelines for report writing. What is a pie chart? For what types of information , is it suitable ? For what type of information is it not suitable?

A good research report is one which does this task efficiently and effectively. As such it must be prepared keeping the following precautions in view:

- While determining the length of the report (since research reports vary greatly in length), one should keep in view the fact that it should be long enough to cover the subject but short enough to maintain interest. In fact, report-writing should not be a means to learning more and more about less and less.
- A research report should not, if this can be avoided, be dull; it should be such as to sustain reader's interest.
- Abstract terminology and technical jargon should be avoided in a research report. The report should be able to convey the matter as simply as possible. This, in other words, means that report should be written in an objective style in simple language, avoiding expressions such as "it seems," "there may be" and the like.
- Readers are often interested in acquiring a quick knowledge of the main findings and as such the report must provide a ready availability of the findings. For this purpose, charts, graphs and the statistical tables may be used for the various results in the main report in addition to the summary of important findings.
- The layout of the report should be well thought out and must be appropriate and in accordance with the objective of the research problem.
- The reports should be free from grammatical mistakes and must be prepared strictly in accordance with the techniques of composition of report-writing such as the use of quotations and use of abbreviations in footnotes and the like.
- The report must present the logical analysis of the subject matter. It must reflect a structure wherein the different pieces of analysis relating to the research problem fit well.
- Appendices should be enlisted in respect of all the technical data in the report.
- Bibliography of sources consulted is a must for a good report and must necessarily be given.
- Index is also considered an essential part of a good report and as such must be prepared and appended at the end.
- Calculated confidence limits must be mentioned and the various constraints experienced in conducting the research study may also be stated in the report.
- Objective of the study, the nature of the problem, the methods employed and the analysis techniques adopted must all be clearly stated in the beginning of the report in the form of introduction.

Pie charts are circles subdivided into a number of "slices." The area of each represents the relative proportion data points falling into a given category. Pie charts are the preferred method for graphing both nominal data and percentages.

Advantages - Pie charts can:

- display relative proportions of multiple classes of data
- show areas proportional to the number of data points in each category
- summarize a large data set in visual form
- be visually simpler than other types of graphs
- permit a visual check of the reasonableness or accuracy of calculations
- require minimal additional verbal or written explanation
- be easily understood due to widespread use in business and the media

Disadvantages - Pie charts can:

- reveal little about central tendency, dispersion, skew, or kurtosis
- fail to reveal key assumptions, norms, causes, effects, or patterns
- fail to describe the attribute, behavior, or condition of interest
- be easily manipulated to yield false impressions