

M.Tech. Food Technology
II Semester Examination 2023
Paper Title: Research Methodology
Paper Code: MFTC-201

Time: 3 hours

Date 21/7/2022

Max Marks: 60

2022
2nd SemSection A (1x10=10 marks)

(All the questions are compulsory for Section A; choose and write the appropriate answer for the multiple choice questions; 1 mark for each question)

M.Tech

1. What are the criteria of good research?
 - a) Objectivity, subjectivity, and intuition
 - b) Relevance, feasibility, and replicability
 - c) Simplicity, complexity, and ambiguity
 - d) Creativity, originality, and intuition
2. What does a research hypothesis do?
 - a) Provides a tentative answer to the research problem
 - b) Describes the population and sample
 - c) Represents data using frequency distribution
 - d) Measures central tendencies
3. Which of the following measures of central tendency is affected by extreme values?
 - a) Mean
 - b) Median
 - c) Mode
 - d) Standard deviation
4. The range is a measure of:
 - a) How data is classified
 - b) How data is diagrammatically represented
 - c) How data is distributed around the mean
 - d) The spread of data from the lowest to the highest value
5. What does the standard deviation represent in a data set?
 - a) The average value of the data
 - b) The measure of the central tendency
 - c) The variability or spread of data from the mean
 - d) The difference between the highest and lowest values
6. Regression analysis is used primarily for:
 - a) Comparing means of two or more groups
 - b) Studying relationships between variables
 - c) Classifying data into categories
 - d) Creating frequency distributions
7. The correlation coefficient measures the:
 - a) Strength and direction of the linear relationship between two variables
 - b) Spread of data around the mean
 - c) Significance level of the study
 - d) Frequency distribution of data
8. The Chi-square test is used to:
 - a) Analyze variance in data
 - b) Compare means of two independent groups
 - c) Examine the relationship between categorical variables
 - d) Determine the standard deviation of data
9. ICMR (Indian Council of Medical Research) is responsible for promoting and funding research primarily in the field of:
 - a) Agriculture and food processing
 - b) Information technology and computer science
 - c) Biomedical and health-related sciences
 - d) Economics and finance
10. Which section of a research report includes a summary of the research objectives, methodology, and key findings?
 - a) Introduction
 - b) Conclusion
 - c) Literature Review
 - d) Abstract

Section B (2x10=20 marks)*(Attempt any two questions from Section B; 10 marks for each question)*

1. Discuss the various steps involved in the selection of a research problem. Elaborate on the importance of justifying the chosen research problem and how theories, hypotheses, and assumptions play a role in shaping the research study.
2. Explain the significance of research in various fields and discuss the ethical considerations researchers must adhere to during the research process. Provide examples of potential ethical issues in research and how they can be addressed.
3. In a study on student performance, the marks of 30 students in a test are as follows:
85, 88, 72, 91, 90, 78, 82, 89, 95, 87, 92, 86, 80, 85, 88, 84, 87, 82, 81, 93, 79, 88, 90, 85, 86, 83, 94, 77, 89, 85

Calculate the range, quartile deviation, and standard deviation for the given data.

4. A researcher wants to study the relationship between hours spent studying and exam scores. The data for a sample of 10 students are as follows:

Hours Spent Studying: 3, 5, 6, 2, 4, 8, 7, 6, 5, 9

Exam Scores: 70, 65, 80, 55, 75, 90, 85, 78, 68, 92

Calculate the correlation coefficient between hours spent studying and exam scores. Interpret the result to determine the strength and direction of the relationship.

Section C (5x6=30 marks)*(Attempt any one internal choice, i.e. either a) or b) from all the Questions 1, 2, 3, 4, and 5 of Section C; 6 marks for each question)*

1. a) Describe the role of DST (Department of Science and Technology) in supporting research. Provide examples of research areas typically funded by DST.
Or
b) Explain the primary objectives of ICMR (Indian Council of Medical Research) and the types of research it primarily supports.
2. a) What are the key components of a well-structured research proposal? Explain the importance of each component in the proposal's overall effectiveness.

Or

- b) Define the impact factor of a journal. How is it calculated, and what does it indicate about the journal's scholarly influence and reach?
3. a) Explain the significance level in hypothesis testing. How is it related to Type I and Type II errors?
Or
b) Define research and explain its significance in various fields.
4. a) Describe random sampling and stratified sampling as two different sampling techniques. Compare and contrast their advantages and limitations.

Or

- b) Define population and sample. Explain the process of data collection and classification.
5. a) The heights (in centimeters) of ten students in a class are as follows:

162, 165, 168, 158, 170, 160, 163, 159, 166, 164

Calculate the mean, median, and mode of the heights of the students.

Or

- b) A researcher wants to study the relationship between the number of hours students spend studying and their test scores. The data for a sample of 8 students are as follows:

Hours Spent Studying: 2, 4, 5, 3, 6, 8, 7, 5

Test Scores: 60, 65, 70, 62, 75, 80, 78, 72

Calculate the regression equation ($y = mx + b$) for the given data, where 'y' represents the test score and 'x' represents the number of hours spent studying.**BTL, CO and PO mapping of the questions:**

Section A	Mapping	Section B	Mapping	Section C	Mapping
1	BTL-2; CO2; PO2,5,6	1	BTL-4; CO4; PO2,3,8	1 a)	BTL-5; CO6; PO1,2,10
2	BTL-1; CO4; PO4	2	BTL-5; CO3; PO2,3,9	1 b)	BTL-2; CO3; PO2,3,10
3	BTL-1; CO4; PO4	3	BTL-3; CO4; PO2,4	2 a)	BTL-1; CO5; PO2,5,6
4	BTL-2; CO4; PO2,4	4	BTL-3; CO5; PO2,5	2 b)	BTL-2; CO7; PO5,6
5	BTL-3; CO4; PO4			3 a)	BTL-2; CO5; PO2,5
6	BTL-2; CO5; PO2			3 b)	BTL-1; CO1; PO1
7	BTL-2; CO5; PO4			4 a)	BTL-3; CO2,4; PO2,4,5
8	BTL-2; CO5; PO5			4 b)	BTL-2; CO2,3; PO2,3,4
9	BTL-1; CO6; PO3,9			5 a)	BTL-5; CO2,4; PO4
10	BTL-2; CO7; PO7			5 b)	BTL-5; CO2,5; PO2,4,5