M.E DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Third Semester

COMMON TO (SE / DS)

P18INT0001: Research Methodology and Statistics

COURSE OUTCOMES

CO1:   Understand and apply the concepts of research

CO2:   Apply statistical and other research tools to analyze and interpret data

CO3:   Demonstrate skills in writing research topics

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions: -

PART A (10 x 1 = 10 Marks)

1. Organize the following steps in the correct order for conducting scientific research: CO1   [K$_3$]

        I. Formulation of hypotheses
        II. Observation of a problem
        III. Data collection and analysis
        IV. Formulation of research objectives

    a)   IV → I → III → II   b)   II → IV → I → III

    c)   I → II → III → IV   d)   III → IV → II → I

2. The formulation of research questions is important because it: CO1   [K$_1$]

    a)   Narrows the research focus   b)   Generates funding

    c)   Reduces the scope of a literature review   d)   Validates the hypothesis

3. What is the primary difference between a population and a sample in statistics?   CO2   [K$_1$]

    a)   A population includes all elements, while a sample includes a subset of elements.   b)   A sample includes all elements, while a population includes a subset of elements.

    c)   A population is used for hypothesis testing, while a sample is not.   d)   A sample is always larger than a population.

4. Match the statistical terms with their definitions: CO2   [K$_1$]

List I	List II

A. Population Proportion	i. The average value of a sample
B. Sample Mean	ii. A measure of the spread of data points from the mean
C. Confidence Interval	iii. The percentage of a population that exhibits a particular characteristic
D. Variance	iv. The range within which a population parameter is estimated to lie, based on sample data

a) A – ii, B – iii, C – iv , D - i   b) A – iii, B – i, C – iv , D - ii

c) A – i, B – iii, C – iv , D - ii   d) A – iv, B – i, C – iii , D - ii

5. Which of the following tests is used to compare the means of two independent groups?   CO3   [K₁]

a) Chi-square test   b) T-test

c) ANOVA   d) Regression Analysis

6. What type of chart is most commonly used to display the relationship between two continuous variables?   CO3   [K₁]

a) Pie chart   b) Scatter plot

c) Box plot   d) Pareto chart

7. Assertion (A): A well-constructed questionnaire is essential for obtaining reliable and valid data.   CO4   [K₁]

Reason (R): A poorly designed questionnaire can introduce bias and affect the quality of the data collected.

a) A is true, but R is false   b) Both A and R are true, but R is not the correct explanation of A

c) Both A and R are true, and R is the correct explanation of A   d) Both A and R are false

8. Which research method is most commonly used to study cause-and-effect relationships?   CO4   [K₁]

a) Case Study   b) Survey Research

c) Experimental Research   d) Ethnography

9. Which of the following are types of primary data collection methods?   CO5   [K₁]

A)Questionnaires

B) Observations

C) Experiments

D) Literature Review

a)	A,B,D	b)	A,B,C
c)	A,B,C,D	d)	B,D

10. What should be included in the "Results" section of a research report?   CO5 [K₁]

a)	Analysis of the data	b)	Raw data without analysis
c)	Discussion of findings	d)	Interpretation of results

PART B (10 x 2 = 20 Marks)

11.	Outline the purpose of formulating research questions.	CO1 [K₂]
12.	Interpret the significance of evaluating a hypothesis.	CO1 [K₂]
13.	Explain sample size, and how is it determined.	CO2 [K₂]
14.	Identify standard error, and why is it important.	CO2 [K₃]
15.	Contrast simple regression and multiple regression.	CO3 [K₂]
16.	Classify the main characteristics of a normal distribution.	CO3 [K₂]
17.	What is a confidence interval?	CO3 [K₁]
18.	Compare between qualitative and quantitative research	CO4 [K₂]
19.	Build the layout of a typical research report.	CO5 [K₃]
20.	Illustrate the importance of clarity in report writing.	CO5 [K₂]

PART C (6 x 5 = 30 Marks)

21.	Discover the purpose of conducting a literature search and review. How does this process inform the research problem and methodology?	CO1 [K₄]
22.	Apply dependent and independent variables in the context of research. Provide examples of each and discuss their roles in hypothesis testing.	CO2 [K₃]
23.	Analyze the difference between a T-test and a Z-test, including when to use each.	CO3 [K₄]
24.	Model the role of data visualization techniques in statistical analysis.	CO3 [K₃]
25.	Identify the importance of survey research and the factors to consider when constructing questionnaires.	CO4 [K₃]

26. Simplify the importance of referencing and citation in research reporting. CO5 [K$_4$]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27. Interpret a detailed plan for conducting a research project in your field of interest. Discuss the steps involved in research planning, including problem selection, formulation of objectives, and the development of research questions. CO1 [K$_5$]

28. Examine measures of central tendency with measures of dispersion. Evaluate how these measures provide different insights into the distribution of data. CO2 [K$_4$]

29. Discuss a detailed explanation on ANOVA, including its assumptions, applications, and the interpretation of results. CO3 [K$_6$]

30. Explain chi-square test, including its application in testing independence and goodness of fit. CO3 [K$_5$]

31. Imagine you are tasked with writing a research report on a recent public health initiative. Discuss how you would plan and structure your report, including the specific data collection methods, analysis techniques, and presentation strategies you would employ to communicate your findings effectively. CO5 [K$_6$]

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