KUMARAGURU
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Register Number:………….…

M.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Second Semester

STRUCTURAL ENGINEERING

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. Sequencing the research flow   CO1   [K1]

     1. Problem identification

     2. Gap analysis

     3. Literature review

     4. Methodology development

     5. Objective formulation

     a)   1-3-2-5-4   b)   1-2-3-4-5

     c)   1-5-3-2-4   d)   1-3-5-2-4

2. Testing hypothesis is a   CO2   [K1]

     a)   Inferential statistics   b)   Descriptive statistics

     c)   Data preparation   d)   Data analysis

3. Which of the following is non-probability sampling?   CO2   [K1]

     a)   Snowball   b)   random

     c)   Cluster   d)   stratified

4. Matching type item with multiple choice code   CO2 [K1]

List I	List II
A. uncertainty	i. summary of database
B. certainty	ii.explained variance
C. skewness	iii. statistical characteristics – measure of normal distribution
D. Mean, standard deviation	iv. probability distribution function

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

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

5. Hypothesis is   CO2 [K2]

a) The conclusion drawn from existing literature   b) Interpretation of data

c) Relation between variables   d) Comparison of assumptions

6. In which of the following research methodologies, manipulation and control of variables and randomization of the sample are 2 of the basic necessities   CO3 [K1]

a) Ex-post facto research   b) Descriptive research

c) Casestudy research   d) Experimental research

7. Assertion (A): statistical characteristics of the database play a major role in defining or strengthening the choice of model/deployment of any technique   CO1 [K2]

Reason (R): the purpose of the research defines the choice of data

a) A & R are individually correct, and R is the correct map to A   b) A & R are individually correct, and R is not the correct map to A

c) A is correct and R is wrong   d) A is wrong and R is correct

8. Which of the following methodology is being used in empirical research?   CO3 [K1]

a) Inductive method   b) Deductive method

c) Initiative method   d) Scientific method

9. Quantative research is otherwise known as   CO2 [K1]

a) Ethnographic approach   b) Unstructured approach

c) Descriptive approach   d) Structured approach

10. Which among the following is not related to qualitative research   CO2 [K1]

a) Thematic analysis   b) Case study

c) Discourse analysis   d) Survey method

PART B (10 x 2 = 20 Marks)

11.	What do you understand by the term literature review?	CO1	[K2]
12.	In research, whether the methodology definition has any impact on the results that are inferred?	CO1	[K2]
13.	Classify the terms objectives and scope in research.	CO1	[K2]
14.	Whether standard deviation and variance are one other the same. Justify your viewpoint.	CO2	[K2]
15.	To summarize a historical database, whether "Mean of the database" will serve the purpose. Justify your perspective.	CO2	[K2]
16.	If a researcher wants to handle the uncertainty associated with the monitored database, whether probability distribution function will serve the purpose. Justify your thought process.	CO2	[K2]
17.	There are 3 variables in a historical database of 100 instances. You are supposed to develop/represent the association between the variables. What will be your choice of equation/model/statistics?	CO2	[K2]
18.	What is the fundamental principle of ANOVA on which it works?	CO2	[K2]
19.	Classify the terms primary and secondary data.	CO3	[K2]
20.	Classify the terms Fundamental research and Applied research	CO3	[K2]

PART C (6 x 5 = 30 Marks)

21.	Discuss the process followed to formulate research objectives.	5	CO1	[KL]
22.	Discuss the process followed to identify a research problem and highlight its research gap.	5	CO1	[KL]
23.	Discuss the data types, and elaborate a process to summarize the database. You may assume relevant data.	5	CO2	[KL]
24.	If variables x1 has a strong correlation with x2 and week correlation with x3, and you are supposed to develop a model that can predict x1. In the above case, what will be the choice of your regression model (linear or multiple-regression), justify your view. You may assume relevant data incase required.	5	CO2	[KL]
25.	In a research article, whether is required to discuss on the research design. If so, whether any novelty is required in the research design or whether the research design can be taken from previous published article. Highlight your thought process on the above.	5	CO3	[KL]
26.	When you are preparing a abstract for your manuscript, how do you structure the statements within 250 words. What is strategy that you adapt for identifying 4 or 5 keywords that relates your research.	5	CO3	[KL]

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

27. To identify the research gap in support of problem definition, you are supposed to prepare state of the art findings. Discuss on the steps / structured method that you will deploy to consolidate the thoughts to summarize the observations and research gaps.   10   CO1   [K3]

28. The length of secondary data collected from trustable sources account to about 30000. Research team where in a critical situation to utilize the data for making a supportive / useful insight. In detailed investigation of the data, there are instances where data is not recorded. You are supposed to fill the missing / non recorded data. Consolidate your thoughts on the way forward to serve the intended purpose. You may assume relevant data.   10   CO2   [K3]

29. From the experimental study conducted during the time period of 200 months, continuous monitoring of variables (x1, x2, and x3) with respect to time (in hours) is captured using a datalogger. You are supposed to summarize the data for a community pitch. Highlight on the methods and techniques that you will deploy to summarize the data that can add value / support your inferences. You may assume relevant data.   10   CO2   [K3]

30. In the process of understanding the human perspective on your research findings, a questionnaire has been designed and deployed for data collection. Uncover the structured process involved in understanding the collected data and associated validation of the inferences. You may assume relevant data.   10   CO3   [K3]

31. A research lab has conducted experimental study for a duration of one year, and identified a groundbreaking finding. Now the team decides to communicate the findings into a structured manuscript. Lead member of the team assigns you to the target of preparing manuscript to you. Highlight the structure of the manuscript, and conceptual understanding of what will be sketched in each and every sub modules of your manuscript.   10   CO3   [K3]

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