

Instrument A	0.86	0.82	0.75	0.61	0.89	0.64	0.81	0.68	0.65
Instrument B	0.87	0.74	0.63	0.55	0.76	0.70	0.69	0.57	0.53

Assuming the populations of measurements to be approximately normally distributed, test the hypothesis of equal variances at 5% level of significance using appropriate statistical test. (Given that the tabulated value at 5% level of significance is 4.43). (9,9)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 10365

K

Unique Paper Code : 2373010014

Name of the Paper : Research Methodology

Name of the Course : **DSE**

Semester : VII (NEP-UGCF)

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.
3. Question no. 1 is compulsory.
4. **All** questions carry equal marks.
5. Use of non-programmable scientific calculator allowed.

1. (a) Fill in the blanks :

(i) The sampling errors arise due to _____ .

(ii) A complete survey of population is called _____ .

(iii) _____ data is the data that is collected originally for the first time.

(iv) An abstract is a _____ .

(v) If the correlation between two variables is close to +1, it indicates a _____ relationship.

(vi) In regression analysis, the variable being predicted is called the _____ variable.

(0.5×6)

(b) Define reliability and validity in research.

Can we conclude that cars equipped with 17 inches- radial tyres give better fuel economy than those equipped with 16-inches radial tyres? Assume the populations to be normally distributed. (Given that the tabulated value at 5% level of significance is 1.796).

(b) Discuss the different non-parametric tests and narrate the various advantages of using non-parametric tests. Also point out their limitations.
(9,9)

6. (a) What points will you keep in mind while preparing a research report? Explain.

(b) Two types of instruments for measuring the amount of sulphur monoxide in the atmosphere are being compared in an air-pollution experiment. It is desired to determine whether the two types of instruments yield measurements having the same variability. The following readings were recorded for the two instruments:

changing drivers, the same cars were then equipped with 16- inches radial tyres and driven once again over the test course. The fuel consumption in kms. per litre, was recorded as follows :

Kilometers per litre		
Car	17 inches radial tyres	16 inches radial tyres
1	4.2	4.1
2	4.7	4.9
3	6.6	6.2
4	7.0	6.9
5	6.7	6.8
6	4.5	4.4
7	5.7	5.7
8	6.0	5.8
9	7.4	6.9
10	4.9	4.7
11	6.1	6.0
12	5.2	4.9

(c) Write about various components of research design?

(d) What are the various means of conducting literature survey in modern times?

(e) Differentiate between

(i) Primary and secondary data

(ii) Simple random sampling and systematic sampling.

(f) "Research is much concerned with proper fact-finding analysis and evaluation". Do you agree with this statement. Justify? (3×5)

2. (a) How would you define research, its significance, components of good research study and distinguish between exploratory research and conclusive research and brief on the research process?

(b) Why do we formulate hypotheses in research?

What criteria should be fulfilled while developing hypothesis and differentiate between various types of hypotheses? (9,9)

3. (a) In today's world there has been a continuous increase in the fossil fuel prices. These vehicles are also contributing a lot to the problem of air pollution leading to major health hazards. Prepare a questionnaire to conduct a survey to study the response of the people towards the use of electric vehicles as an alternative to the existing fuel vehicles.

(b) Why probability sampling is generally preferred in comparison to non-probability sampling? Explain the procedure of selecting a simple random sample. (9,9)

4. (a) Enumerate the different methods of collecting data.

Which one is the most suitable for conducting enquiry regarding family welfare programme in India? Explain its merits and demerits.

(b) Two independent samples of 8 and 7 items gave the following values :

Sample A	9	11	13	11	15	9	12	14
Sample B	10	12	10	14	9	8	10	

Examine whether the difference between the means of two samples is significant at 5% level? (Given that the tabulated value at 5% level of significance is 2.16). (9,9)

5. (a) A radio taxi company manager is trying to decide whether the use of 17-inches radial tyres instead of 16- inches radial - tyres improve fuel economy. Twelve cars were equipped with 17-inches tyres and driven over a prescribed test course. Without