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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. (Take tabulated value as 4.43 for hypothesis testing).

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2612

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Unique Paper Code : 2373010014

Name of the Paper : Research Methodology (NEP-UGCF)

Name of the Course : **B.Sc. (H) Statistics**

Semester : VI

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. Question no. **1** is compulsory.
3. **All** questions carry equal marks.
4. Use of non-programmable scientific calculator is allowed

1. (a) Fill in the blanks :

- (i) The difference between sample statistic and population parameter is called _____ .
- (ii) _____ sampling ensures that every unit has an equal chance of selection.
- (iii) Data collected from published sources is termed _____ data.
- (iv) Research that deals with descriptive and numerical data is called _____ research.
- (v) The ratio scale includes variables that have a true _____ .
- (vi) Data collected over the same sample or the group of subjects over different time periods is known as _____ .

(b) Define objectivity and generalizability in research.

hypothesis. (Given Tabulated value at 5% level of significance is 2.201)

- (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:

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

Kilometres 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

Write suitable test to compare the mean kilometres per litre for the two types of tyres using 0.05 level of significance. State the null and alternate

- (c) Explain the difference between collection of data procedure through schedules and questionnaires
- (d) Discuss the role of digital databases in conducting literature surveys.
- (e) Differentiate between Primary and Secondary data.
- (f) “Research is much concerned with proper fact-finding analysis and evaluation”. Do you agree with this statement. Justify. (6×0.5,3,3,3,3,3)
- 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)

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3. (a) “Rising concerns about climate change have increased interest in renewable energy”. Prepare a survey questionnaire to study public perception of solar energy adoption in households.

(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 :

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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 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 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 :

P.T.O.