

Ph. D. IN STATISTICS (PHDSTAT)

Term-End Examination

December, 2024

**RST-001 : RESEARCH METHODOLOGY IN
STATISTICS**

Time : 3 Hours

Maximum Marks : 100

Note : (i) *Question No. 1 is compulsory.*

(ii) *Attempt any **four** questions from question nos. 2 to 7.*

(iii) *Non-programmable/scientific calculator is allowed.*

(iv) *Symbols have their usual meanings.*

1. (a) State whether the following statements are true or false. Give reasons in support of your answers : $4 \times 2 = 8$

- (i) In an interview, rejecting a candidate who is suitable for the job will give rise to Type-II error.

- (ii) If the monthly incomes (in thousand rupees) of a random sample of five workers in a small company are 25, 20, 30, 15 and 10, then the unbiased estimate of the average monthly income of all workers will be 20.
- (iii) A researcher should control the dependent variables while conducting experimental research.
- (iv) The standard deviation of 10 values of a data is 50. If each value is divided by 5, then the new standard deviation would become 10.
- (b) Differentiate between the following and give *one* example of each : $3 \times 4 = 12$
- (i) Experiment and Survey
- (ii) Research method and Research methodology
- (iii) Null and Alternative hypotheses
- (iv) One-way ANOVA and Two-way ANOVA

2. (a) Give various definitions of research and explain its meaning and scope. 10
- (b) Explain the significance of research in statistics in various fields. 10
3. (a) Show that Spearman's rank correlation coefficient is : 10

$$r_s = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n(n^2 - 1)}$$

- (b) Describe various uses of Chi-square test. 10
4. (a) The monthly income of five employees in a company are as follows :

25, 20, 30, 15, 10

- (i) List all possible samples (without replacement) of size 2, 4
- (ii) Compute the mean of all samples and set up the sampling distribution of sample mean. 4
- (b) Design a questionnaire on uses of smart phones in day-to-day life. 12

5. Write short notes on any *two* of the following :

10+10

- (i) Research proposal
- (ii) Review of published literature
- (iii) Research report

6. Describe the steps involved in research process with suitable examples. 20

7. Describe various problems encountered by a researcher in India. 20

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