

**Ph.D. IN STATISTICS  
(PHDSTAT)**

**Term-End Examination**

00185

June, 2018

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

*Time : 3 hours*

*Maximum Marks : 100*

*Note : Question no. 1 is compulsory. Attempt any four questions from questions no. 2 to 7. Non-programmable scientific calculator is allowed. Symbols have their usual meanings.*

1. (a) State whether the following statements are *True* or *False*. Give reasons in support of your answer.  $5 \times 2 = 10$
- (i) If 25 is subtracted from each value of X and Y, and then divided by 10, the new  $b'_{yx}$  is 2.5 times of  $b_{yx}$ .
  - (ii) When population size N is a multiple of sample size n, then circular systematic sampling is more appropriate.
  - (iii) The sum of deviations of all the observations taken from their mean is 4.6.

- (iv) The explanatory research and conclusive research have the same process of research.
- (v) The decision oriented report can be classified into survey based and algorithmic research reports.
- (b) Differentiate between : 5×2=10
- (i) Descriptive research and Experimental research
  - (ii) Primary data and Secondary data
  - (iii) Variance and Coefficient of variation
  - (iv) Type-I error and Type-II error
  - (v) Decision oriented research report and Research oriented research report
2. (a) What are the types of research ? Explain them in brief. 12
- (b) Discuss the need for research. Also define the research methodology. 8
3. (a) Design a questionnaire to collect the data for analysing employee's morale in an organisation. 12
- (b) The mean and standard deviation of 20 items are found to be 10 and 2, respectively. At the time of checking, it was observed that one item 8 was incorrect. Find the mean and standard deviation, if (i) the wrong item is omitted, (ii) it is replaced by 12. 8

4. Given the following bivariate data :

X :	10	12	13	17	18
Y :	5	6	7	9	13

Find :

- (i) the two regression lines,
- (ii) the correlation coefficient, and
- (iii) the standard deviation of Y, if standard deviation of X is 3. 20

5. (a) The mean weight of two samples of 1000 and 2000 members are 67.5 kg and 68 kg respectively. Can the samples be regarded as drawn from the same normal population with common standard deviation 2.5 kg at 5% level of significance ?

Given that  $\chi^2(1)$  at 5% level of significance = 3.84. 6

(b) Out of 800 persons, 20% were literate and 300 had travelled beyond the limits of their district. 40% of the literates were among those who had not travelled. Prepare a  $2 \times 2$  table and test at 5% level of significance whether there is any association between travelling and literacy. 14

6. A farmer applies three types of fertilizers on 4 separate plots. The figures on yield per acre are tabulated below :

Fertilizer	Yield Per Plot				Total
	A	B	C	D	
Nitrogen	6	4	8	6	24
Potash	7	6	6	9	28
Phosphates	8	5	10	9	32
Total	21	15	24	24	84

Test (i) whether the plots are materially different in fertility, and (ii) if the three fertilizers make any material difference in yields. Given that  $F(2, 6) = 5.14$  and  $F(3, 6) = 4.76$ .

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7. (a) What are the different types of research reports? Explain them in brief. 12
- (b) Give a sample of COVER PAGE of a research report. 8