

Roll No.

Total No. of Pages : 02

Total No. of Questions : 08

Ph.D in Faculty of Applied Science (Physical Science)

## RESEARCH METHODOLOGY

M.Code : 77400

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carry TWENTY marks.

1. a) What is Research? Explain the various types of research.  
b) Distinguish between Research methods and Research methodology. Explain with examples.
2. a) What are the criteria and qualities of good research? Explain.  
b) Write down the various problems faced by researchers in India.
3. a) What are the merits and demerits of using LaTeX over MS- Word?  
b) Write the syntax in LaTeX for the following formulas :

i) 
$$b_{YX} = \frac{N \sum f_{XY} - \sum f_X \sum f_Y}{N \sum f_{X^2} - (\sum f_X)^2}$$

ii) 
$$s^2 = \frac{1}{N} \sum f_i x_i^2 - \bar{x}^2$$

4. a) Write the steps to export text files in Excel.  
b) What do you mean by Null hypothesis and Alternate hypothesis?  
c) What is the difference between Type I Error and Type II Error?  
d) How can Microsoft Excel help the researchers?

5. Determine two regression lines by calculating the regression coefficients from the following data :

X	1	2	3	4	5
Y	7	6	5	4	3

6. a) Fit a straight line best fits the following data in the least square sense?

X	1	2	3	4	5
Y	14	13	9	5	2

- b) Fit a second degree parabola from the following data :

X	0	1	2	3	4
Y	1	1.8	1.3	2.5	6.3

7. a) Find the missing frequency f, if arithmetic mean is 18 :

Class Intervals	11 - 13	13-15	15 -17	17-19	19 - 21	21-23	23-25
Frequency	3	6	9	13	f	5	4

- b) Calculate the standard deviation from the following :

Class Intervals	10-29	30-49	50-69	70-89	90 - 109	110-129	130 -149
Frequency	2	3	12	22	20	14	2

8. a) What is Factor analysis? Explain the types of Factor analysis.  
b) What do you mean by Canonical correlation analysis?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.