Roll No. | | | | | | | | | | | | | **Total No. of Pages : 01**

Total No. of Questions : 08

PHD

RESEARCH METHODOLOGY

Subject Code : MPHM-101

Time : 3 Hrs. **Max. Marks : 100**

INSTRUCTIONS TO CANDIDATES :

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

Q1. a) What is Research? Explain objectives and significance of research.

b) Explain research process in detail.

Q2 a) Discuss the criteria for good research.

b) How do we download and install LATEX package?

Q3 a) How do we solve the equation $x^3 - 6x^2 + 11x - 6 = 0$ using MATHEMATICA?

b) Write a program in MATLAB to add two matrices of order3 × 3.

Q4 a) Write a program in MATLAB to find inverse of a matrix of order3 × 3.

b) Explain the term FORMULAS IN MS Excel. Illustrate through examples also.

Q5 a) How do we filter data in MS Excel? Explain through examples.

b) Write a program in MATLAB to compute a real root of $f(x) = e^{-x} - sinx - 0$.

Q6 a) Prove that the necessary and sufficient condition for the three planes of regression to be coincident is that

$$r_{12}^2 + r_{13}^2 + r_{23}^2 \pm 2\, r_{12}\, r_{13}\, r_{23} = 1$$

b) Explain the various steps for ANOVA testing in one way classification.

Q7 a) Prove that if variables are uncorrelated, the two lines of regression become perpendicular to each other.

b) Establish that in case of continuous random variable it does not matter if one or both the ends of the interval (c, d) are included or not?

Q8 a) In order to test whether a coin is perfect, it is tossed 5 times. The null hypothesis of perfectness of the coin is accepted if and only if atmost three heads are obtained. Find the power of the test corresponding to the alternative hypothesis that probability of head is 0.4.

b) The mean of 5 observations is 4.4 and variance is 8.24. If three of the five observations are 1, 2 and 6, find the values of the other two.