BB345

M. Sc. EXAMINATION, 2020

(5 Year Integrated)

(Second Semester)

(B Scheme)

(Re-appear)

MATHEMATICS

MAT220H

Regression Analysis and Probability

B. Sc. (Hons.) M. Sc. (Mathematics)

Time : 3 *Hours*]   [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : The question paper consists four units and a compulsory question. Examiner has set nine questions in all, with each question carrying equal marks. The students should attempt a total *five* questions, by selecting at least *one* question from each Unit and a compulsory question.

(Compulsory Question)

1. (a) Write any *two* properties of regression coefficients.   **2½×6=15**

   (b) Write the formula used to find the angle between two lines of regression.

   (c) Two unbiased dice are thrown. Find the probabilities that both the dice show the same number.

(d) Write the statement of Bayes' theorem.

(e) What is the chance that a leap year selected at random will contains 53 Sundays ?

(f) Define the term Kurtosis.

Unit I

2. In a partially destroyed laboratory, record of an analysis of correlation data, the following results only are legible : **15**

   Variance of $x = 9$, Regression Equations :

   $$8x - 10y + 66 = 0, \ 40x - 18y = 214$$

   What are :

   (a) the mean values x and y

   (b) the correlation coefficient between x and y, and

   (c) the standard deviation of y ?

3. Fit an Exponential curve of the form $y = ab^x$ to the following data : **15**

x	:	1	2	3	4	5	6	7
y	:	2	2.4	2.6	3	3.4	4	4.2

Unit II

4. An urn contains 6 white, 4 red and 9 black balls. If 3 balls are drawn at random, find the probability that : **15**

   (a) two of the balls drawn are white

   (b) one is of each colour

   (c) none is red

   (d) at least one is white.

5. If two dice are thrown, what is the probability that the sum is : **15**

   (a) greater than 8

   (b) neither 7 nor 11 ?

Unit III

6. From a lot of 25 items, containing 5 defectives, a sample of 4 items was drawn at random (i) without replacement, (ii) with replacement. Find the probability distribution of x, the number of defectives. **15**

7. State and derive Bayes' Theorem. **15**

Unit IV

8. Calculate the first four moments of the following distribution about mean and hence find β_1 and β_2 : **15**

x	:	1	2	3	4	5	6	7
y	:	4	5	9	7	10	11	14

9. For a distribution, the mean is 10, variance is 16, y, is +1 and B_2 is 4. Obtain the first four moments about the origin. Comment upon the nature of distribution. **15**