5. Two dice are tossed. Find the probability of getting an even number on the first die or a total of 8'. **15**

Unit III

6. The contents of Urn I, II and III are as follows :

1 white, 2 black and 3 red balls

2 white, 1 black and 1 red balls and

4 white, 5 black and 3 red balls

One Urn in chosen at random and two balls drawn. They happen to be white and red. What is the probability that they come from Urns I, II or III ? **15**

7. A random variable X has the following probability function : **15**

Values of X_1 x,	P(x)
0	0
1	k
2	$2k$
3	$2k$

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Dual Degree B. Sc. (Hons.)

EXAMINATION, May 2018

(Second Semester)

(Main & Re-appear)

MAT220H

REGRESSION ANALYSIS AND PROBABILITY

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 : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (a) Write the statement of Bayes Theorem. **2½**

(b) Write the basic properties of moments. **2½**

(c) Explain the terms : **2½**

(i) Random variables

(ii) Probability density function.

(d) Explain Boole's in Equality. **2½**

(e) Write the properties of regression coefficient. **2½**

(f) Statement of principle of least squares. **2½**

Unit I

2. (a) A and B throw alternately with a single die, A having the first throw. The person who first throws ace is to win. What are their respective chances of winning ? **8**

(b) Find the angle between two lines of regression. **7**

3. For 5 randomly selected observations, the following data were recorded :

Observation No.	Overtime hrs. (X)	Additional Unit (Y)
1	1	2
2	1	7
3	2	7
4	2	10
5	3	8

Determine the coefficients of regression and regression equation using the non-linear form $y = a + b_1X + b_2X^2$. **15**

Unit II

4. Three bags A, B, C, contain 4 red, 3 black, 2 white; 3 red, 4 black, 4 white; and 5 red, 2 black, 6 white balls respectively. If a bag is selected at random and a ball is drawn from it. Find the probability that the ball drawn is red. **15**

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

X	F
0	1
1	8
2	28
3	56
4	70
5	56
6	28
7	8
8	1

4	$3k$
5	k^2
6	$2k^2$
7	$7k^2 + k$

(a) Find k.

(b) Evaluate :

$P(X < 6),\ P(X \geq 6),\ P(3 < X \leq 6)$

(c) Find the minimum value of x so that

$P(X \leq x) > \frac{1}{2}$..

Unit IV

8. Calculate the mean and standard deviation for the following table giving the age distribution of 542 members : **15**

Age	No. of Members
20-30	3
30-40	61
40-50	132
50-60	153
60-70	140
70-80	51
80-90	2