BRAC UNIVERSITY

Inspiring Excellence

Department of Mathematics and Natural Sciences

Midterm Examination

Fall 2022

Course Title: Elements of Statistics and Probability (STA201)

Section 20

Total Marks: 40

Duration: 1.30 hours

Date: November 08, 2022

Special Note:

i. **Return your question paper with your answer script**

ii. **Answer all questions**

1. The weight and systolic blood pressure (BP) of eight randomly selected males in the age group 25 to 30 are shown in the following table.

Weight (lb)	165	167	180	155	210	175	190	210
Systolic BP	130	133+K	150	128	146	150	140	148

Here, **K** is the **seventh digit** of your student ID. Suppose your ID is 22101032, then K will be 3.

a. Determine the five number summary for Systolic BP. [5 marks]

b. Determine the relationship between Weight and Systolic BP mathematically and hence comment on it. [4 marks]

c. Determine the value of the coefficients of a regression line on Systolic BP given weight. [3 marks]

d. Write down the estimated regression equation and hence interpret. [4 marks]

e. If the weight of a male is 220 lb, then predict his systolic blood pressure. [2 marks]

f. Comment on the goodness of fit of the regression model? [2 marks]

2. The following table gives the grouped data on the weights of all 100 babies born at a hospital in 2020.

Weight (Pounds)	3-5	5-7	7-9	9-11	>11
Number of babies	5	25+X	40	20	$2+\frac{X}{2}$

a. Compute the mean, median and modal number of babies. [8 marks]

b. Anaya invested Tk. 50,000 in an online startup. The business increased in value by 5% in the first year, decreased by 3% in the second year, and continued to increase by 8% from the third year onward. What was the average growth rate of the startup over the first 3 years? What will be the value of Anaya's investment after 6 years? [4 marks]

3. The following data give the numbers of pieces of junk mail received by 10 families during the past month.

41 33 28 21 29 19 14 31 39 36+Z

Here, Z is the summation of the last two digits of your student ID. Suppose your ID is 22101042, then Z will be 4+2=6.

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a. Determine the standard deviation for the data. [4 marks]

b. Analyzing another sample of ten families, you found their mean to be 40 and standard deviation to be 7.2. Which sample has more variation in their number of receiving junk mails? [4 marks]