United International University

School of Science and Engineering

Mid Term Exam Trimester: Fall-2021

Course Title: Probability and Statistics

Course Code: Math 2205/Stat 205 Marks: 30 Time: 1 Hour 45 Minutes

[Note that the number of marks is given in brackets [ ] at the end of each question or part question.]

[You have to answer all the questions.]

Q1. a) A fair dice rolled twice. The event R is such that the sum of the two outcomes is 7. The event S is such that the product of the two outcomes is 12. **[4]**

(i) Find the probability of R

(ii) Find the probability of S

(iii) Are events R and S independent? Justify your answer.

b) At the beginning of a certain study of a group of persons, 16% were classified as heavy smokers, 36% as light smokers, and 48% as nonsmokers. In the five-year study, it was determined that the death rates of the heavy smokers, light smokers and non-smoker were 50%, 30% and 10% respectively. A randomly selected participant died over the five-year period; calculate the probability that the participant was a nonsmoker. **[4]**

Q2. a) Consider the following frequency distribution of daily expenditure of 100 UIU students.

Expenditure (BDT)	0-100	100-200	200-300	300-400	400-500
No of students	9	19	34	27	11

(i). Sketch the Histogram **[3]**

(ii). Find the mean and Median. **[4]**

(iii). Estimate the Standard deviation. **[3]**

b) For a distribution the following measures are summarized, state and sketch the nature of the distribution. **[2]**

Mean = 30.8, Median = 31.35, and Mode = 32.7

Q3. a) Discuss the strength of correlation from the following Pearson' correlation coefficient. **[1]**

(i) $r = 0.15$ (ii) $r = -1$

b) The years of experience (x) and the annual turnover ($\$y$) are presented in the following table.

Years of experience	x	3	4	5	6	9	10
Sales Volume in thousand \$	y	80	94	102	105	115	123

(i). Using the above set of data calculate the value of r (coefficient of correlation) and interpret the result **[3]**

(ii). Find the regression line in the form $y = a + bx$. **[3]**

(iii). Verify your model found in question (ii) with the tabular value for 6 years' experience. **[2]**

(iv). Predict the annual sales turnover for a person with 12 years' experience. **[1]**