Institute of Information Technology
First Year First Semester Final Exam 2020
Subject: Software Engineering
Course Code: STAT - 103
Course Name: Probability & Statistics for Engineers-I

Time: 1 Hour 15 Mins **Total Marks: 30**

[Answer all the questions. All questions are of equal value]

1.(a) Define Statistics. How do you use statistics in software engineering?-explain briefly. ***2***

(b) Using the following data

1.4, 2.4, 3.7, 3.1, 2.2, 8.9, 2.5, 2.8, 2.2, 1.7, 3.1, 5.5, 2.2, 1.8, 2.6 ***4***

(i) Compute the sample mean, median, and mode.

(ii) Construct a box plot, comment on the skewness of that distribution, and also identify is there any outlier or extreme value?

2.(a) Define scatter diagram. What are the differences between correlation and regression analysis? ***2***

(b) The following data gives the information on child mortality and expected life frequency of 5 different countries. The data are recorded as follows: ***4***

Child mortality (per 1000), x	25	5	7	20	13
Expected life (years), y	60	81	80	65	75

(i) Determine the coefficient of correlation.

(iii) Fit a regression line.

(iv) Predict the expected life for a country having child mortality 50 (per 1000).

3.(a) Maruf has a blue car and a red car. He drives the blue car 80% of days, and the red car on the other days. If he takes the blue car, it gives trouble 5% of times, while the red car gives trouble 10% of the times. Maruf is driving to Sylhet today. What is the probability that he will have car trouble? ***2***

(b) Calculate marginal densities of X and Y from the following joint density function and verify that marginal distributions are also probability distributions. ***4***

$$f(x, y) = k\ (6 - x - y) \qquad ; 0 < x < 2 \quad and \quad 2 < y < 4$$

(i) Find k=? (ii) Also compute $P(X + Y < 3)$.

4.(a) Let X, waiting time in minutes, be a continuous random variable with cumulative distribution function $F(x) = 1 - \exp(-8x)$, $x > 0$. Find the probability of waiting less than 12 minutes (i) using the cumulative distribution of X and (ii) using the probability density function of X. ***4***

(b) The number of earthquakes, X, observed in a 5-year interval has a probability distribution given by ***2***

$$P(X = x) = c\,\frac{\lambda^x}{x!}\ ;\ \ x = 0, 1, 2, \ldots$$

where λ is a positive integer. Find the value of C.

5.(a) Define Normal distribution? What are the important properties and uses of Normal distribution? ***4***

(b) Find the maximum likelihood estimate of the Poisson parameter λ. ***2***