International Islamic University Chittagong (IIUC)
Department of Economics & Banking
Final Examination; Autumn-2018
Program: BSS(Honours)

Course Code: **STAT-2402** Course Title:Statistical Analysis
Time: 2.5 Hours Full Marks: 50

Answer any FIVE of the following questions. All parts of a question must be answered sequentially. Figures in the right margin indicate full marks.

1. (a) Define Bernoulli Trials. Find the mean and variance of Bernoulli distribution. 06
   (b) If the mean and variance of a binomial distribution is 5 and 3.75, then write the probability function of the binomial distribution. 04
2. (a) Define binomial distribution with some examples and state its important properties. 03
   (b) Show that the sum of all probabilities for a binomial variate is equal to one. 03
   (c) A certain manufacturing process yield electrical fuses of which, in the long run 10% are defective. Find the probability that in a sample of 10 fuses selected at random there will be (i) no defective (ii) at least one defective (iii) No more than one defective. 04
3. (a) Define Poisson distribution with some examples and state its important properties. 03
   (b) Show that the mean of poisson distribution is equal to its parameter. 04
   (c) A car hire firm has two cars. which it hires out day by day. The Number of demands for a car on each day is distributed as Poisson variate with mean 1.5. Out of 100 days, calculate the number of days on which (i) neither car is used (ii) some demand is refused. 03
4. (a) Define normal distribution with some examples and properties. What is the importance of normal distribution? 04
   (c) The customer accounts of a departmental store have an average balance of Tk 6500 and a standard deviation of Tk. 1500. Assuming that the account balances are normally distributed, then find the probability that a customer has account balance over 7200 Tk. If the total number of customers for the departmental store is 10000, then find the number of customers having the account balances between Tk.5000 to Tk.7800? 06
5. (a) Define standard normal distribution and state its important properties. 03
   (b) Show that the mean of a standard normal distribution is zero and variance is equal to one. 04
   (c) The weekly wages of 5000 workers in a factory are normally distributed with mean of Tk 6000 and a standard deviation of Tk 2000. Find the number of workers having the weekly wages between Tk.5000 to Tk. 6500. 03
6. (a) Define population and sample. What are the essential conditions of a sample survey? 03
   (b) Draw all possible sample of size 2 from the observations 15,7,8,3,6. Obtained the sampling distribution of sample mean and find the expectation of sample mean. 04
   (c) For decision- making regarding freight rates, track maintenance, diesel fuel consumption, et cetera, a consumption of railroads wishes to estimate with 95% confidence for the mean number of cars such that the sample estimate ($\bar{x}$) and population mean (μ) differ, either high or low, by no more than 5 cars; that is, 03

$$|\bar{x} - \mu| \leq D=5$$

Assuming the number of freight cars follows normal distribution with the population variance be $\sigma^2 = 225$, how large must n be to satisfy these condition?
Here D is the largest allowable sampling error between the estimated and the true value of the population parameters.

7. (a) Define sampling error and non-sampling error. 02
   (b) State the principal steps involved in a sample survey. 02
   (c) Draw a random sample of size 08 from the following population with size 40 by using simple random sampling; 06

Marks obtained in Statistics (out of 80) by 40 students are given below;

65,	66,	30,	72,	66,	64,	60,	72,	55,	62,	54,	57,	71, 74,
65,	59,	69,	70,	67,	59,	74,	68,	64,	63,	38,	71,	75, 56,
45,	58,	62,	44,	68,	74,	80,	77,	72,	57,	55,	66.	

Also estimate the mean marks with its standard error.