Bangabandhu Sheikh Mujibur Rahman Science and Technology University
Department of Computer Science and Engineering
1st Year 2nd Semester B.Sc. in CSE Examination-2013
Course No-STA154 Title: Statistics for Engineers

Full Marks:70 Time: 3 hours

N.B.

i. Answer **SIX** questions, taking any **THREE** from each section.
ii. All questions are of **equal** values.
iii. Use separate answer script for each section.

Section A

1. a) Define Statistics. What are the applications of statistics. 3

   b) How do you distinguish a discrete variable from a continuous variable? 3

   c) Define interval level data and ratio type data with example. 2

   d) What is frequency table? Draw a histogram, and frequency polygon from the following frequency table: $3\frac{2}{3}$

Class Interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	5	6	8	10	7	5	4

2. a) The following figures refer to the employment of the Bangladesh nationals abroad in 1996 as given by the BBS: 4

Profession	Number employed
Professionals	3188
Skilled	64301
Semi-skilled	34689

   Use the data to construct a pie-chart.

   b) What is stem and teaf diagram? Distinguish between a histogram and bar-diagram with example. 4

   c) What are the advantages of graphical presentation of statistical data over tabular presentation? $3\frac{2}{3}$

3. a) What is meant by central tendency of data? Show that mean of a set of constant values is the value/constant itself. 4

   b) What is a weighted average? If a variable x can take values 1, 2, 3, ….., n and their corresponding frequencies are 1, 2, 3, ….., n then find the weighted average. 4

   c) In a survey on the taste of a need natural foods snack, the number of people indicating various responses were as follows: $3\frac{2}{3}$

Response	Number
Excellent	25
Good	27
Fair	28
Not good	10
Poor	7
Very good	3

   What are the median response and modal response?

4. a) What are the important measures of dispersion? Given below are the monthly household incomes in (Tk.) for ten families: 10648, 17416, 6517, 13555, 14821, 9226, 152936, 11800, 18527, 12222. Compute the range and standard deviation as measure of variability. 4

   b) What is the skewness and kurtosis? Comment on the frequency distribution when it is characterized with the following measures: $\beta_1=0$, $\beta_2<3$, $\beta_2>3$ and $\beta_2=3$. 4

   c) Distinguish between correlation and regression with example. Also show that correlation of a variable with itself is unity. $3\frac{2}{3}$

Section B

5. a) Explain the followings with examples: 4
   (i) Random experiment
   (ii) Outcome
   (iii) Favourable cases
   (iv) Classical probability

   b) If A and B are two events in a event space, then show that 3
   $P(A \cup B)=P(A)+P(B)-P(A \cap B)$.

   c) Two unbiased dice are thrown. Find the probability that (i) first die shows 5 or sum of the upper faces is more than or equal to 8, (ii) second die shows 4 or sum of the upper faces is more than 8. $4\frac{2}{3}$

6. a) State and prove complimentary law of probability. 4

b) What is multiplication rule of probability? Extend this rule for more than two events. 4

c) A coin is biased. A head is twice as likely as tail. If the coin is tossed in three times, what is the probability of getting 2 heads and 1 tail. $3\frac{2}{3}$

7. a) What is a random variable? Distinguish between probability mass function and probability density function. 4

b) A continuous random variable x has the following density function $f(x)=\frac{2(x+1)}{27}; 2\leq x\leq 5$. Find (i) $P(x\leq 4)$ and (ii) $P(3\leq x\leq 4)$ 4

c) Define mathematical expectation of a random variable. Given the following pdf of a random variable x: f(x)=2(1-x); $0\leq x\leq 1$. Find E(x). $3\frac{2}{3}$

8. a) What is the binomial distribution? The mean of a binomial distribution is 6 and variance is 2.4 . Find n and P. 4

b) What is stochastic process? Distinguish between markov process and markov chain. 4

c) State the important properties of normal distribution. $3\frac{2}{3}$