ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Mathematics & Statistics)

Course: Statistics-II (395)   **Semester: Spring, 2014**
Level: Intermediate   **Total Marks: 100**
         Pass Marks: 40

ASSIGNMENT No. 1

Q.1 a) Define the normal probability density function and the normal cumulative distribution function. Give the equation of the normal curve with mean μ and standard deviation σ.

  b) Suppose that the life in hours of an electric tube manufactured by a certain process is normally distributed with parameters $\mu = 160$ hours and σ hours. What is the maximum allowable value for σ, if the life X of a tube is to have probability 0.80 of being between 120 and 200 hours?   (10+10)

Q.2 a) Explain the terms: Population; Sample; Sampling frame; Sampling unit, Statistic & Sampling distribution.

  b) A large number of samples of size 50 were selected at random from a normal population with mean μ and variance σ^2. The mean and standard error of the sampling distribution of the sample mean were obtained 2500 and 4 respectively. Find the mean and variance of the population.   (10+10)

Q.3 a) What is meant by unbiasedness? Differentiate between an unbiased and a biased estimator.

  b) A random sample of 16 values from a normal population showed a mean of 41.5 inches and a sum of squares of deviations from this mean equal to 135 (inches)^2. Show that the 95% confidence limits for this mean are 39.9 and 43.1 inches.   (10+10)

Q.4 a) In a poll of college students in a large state university, 300 out of 400 students living in dormitories approved a certain course of action, whereas 200 out of 300 students not living in dormitories approved it. Estimate the difference in the proportions favoring the course of action and compute 90% confidence interval for it.

b) Ten dry cells were taken from store and voltage tests gave the following results: 1.52, 1.53, 1.49, 1.48, 1.47, 1.49, 1.51, 1.50, 1.47, 1.48 volts. The mean voltage of the cells when stored was 1.51V. Assuming the population standard deviation to remain unchanged at 0.02V, is there reason to believe that the cells have deteriorated. (10+10)

Q.5 a) Why is the z-test usually inappropriate as a test-statistic when the sample size is small?

b) A machine puts out 16 imperfect articles in a sample of 500. After the machine is overhauled, it puts out 3 imperfect articles in a batch of 100. Has the machine been improved? Use 5% level of significance. (10+10)

ASSIGNMENT No. 2

Total Marks: 100   **Pass Marks: 40**

Q.1 a) Write down the properties of normal distribution.

b) In a normal distribution lower and upper quartiles are 28 and 55 respectively. Find mean and standard deviation of the normal distribution. (10+10)

Q.2 a) What is meant by a sampling distribution and a standard error? Describe the properties of the sampling distribution of sample mean.

b) Given the population 1, 1, 1, 3, 4, 5, 6, 6, 6 and 7. Find the mean and standard deviation for the sampling distribution of mean for a sample of size 36 selected at random with replacement. (10+10)

Q.3 a) Define "Student's t-statistic". What are its assumptions? Explain briefly its use and importance in statistics.

b) A sample of 400 male students is found to have a mean height of 67.47 inches. Can it be regarded as a simple random sample from a large population with mean height 67.39 with standard deviation of 4.3 inches? (10+10)

Q.4 a) Differentiate between regression and correlation problems, explain with examples.

b) The following table shows the marks in statistics and mathematics obtained by students from a large group of students. (10+10)

Marks in Statistics x_i	75	80	93	65	87	71	98	68	84	77
Marks in Mathematics y_i	82	78	86	72	91	80	95	72	89	74

Find the correlation coefficient and interpret the results.

Q.5 a) How computers are generally classified? What are the four major categories of computers?

b) An examination was taken to two classes of 40 and 50 students respectively. In the first class, mean grade was 74 with a standard deviation of 8, while in the second class the mean grade was 78 with standard deviation of 7. Is there a significance difference between the mean grades at 1% level? (10+10)