Course Code: MEC 309

Course Name: Quality Engineering & Management Systems

Assignment No. 1

DOA: 12-Feb-2010   **DOS:** 22-Feb-2010(For Section OE 165)

                                                  23-Feb-2010(For Section OE 166)

Part A

Q.1 The mean and the standard deviation of a sample of 100 observations was calculated as 40 and 5.1 respectively. While comparing with the original data it was found that by mistake a figure of 40 was miscopied as 50 for one observation. Calculate the correct mean and standard deviation of the sample.

Q.2 Assuming the life in hours of an electric bulb is a random variable following normal distribution with mean of 2,000 hours and standard deviation of 400 hours.

    Find the expected number of bulbs from a random sample of 2000 bulbs having life

        a) More than 3000 hours

        b) Between 2600 and 2800 hours

Q.3 Tests have indicated that the tensile strengths of certain aluminium alloys average 1,785 kg/cm^2 with a standard deviation of 220 kg/cm^2. If the distribution is normal what percentage of the casting will have

        a) Tensile strength less than 1400 kg/cm^2

        b) More than 1500 kg/cm^2.

Part B

Q.4 A single sampling plan uses a sample size of 15 and an acceptance number 1. Using hypergeometric probabilities, compute the probility of acceptance of lots of 50 article 2% defective.

Q.5 The lot size N is 2,000 in a certain AOQL inspection procedure. The desired AOQL of 2% can be obtained with any one of the three sampling plans. These are:

        a) n = 65, c = 2

        b) n = 41, c = 1

        c) n = 18, c = 0

If a large number of lots 0.3% defective are submitted for acceptance, what will be the average of units inspected per lot under each of these sampling plans?

Q.6 Design a sequential plan for the specifications:

$$\alpha = 0.05, \qquad P_1 = 0.10$$
$$\beta = 0.20, \qquad P_2 = 0.30$$

Also compute:

        a) Average outgoing quality when $p' = p_1$

        b) Minimum number of items inspected for accepting the lot.

        c) Minimum number of defectives for rejection of the lot.

        d) Average number of items inspected when the quality of the lot is p_1.