Indian Statistical Institute, Bangalore

Statistical Quality Control & Operation Research Unit

MS (QMS) First Year [Batch 2023-2024]

First Semester - **Total Quality Management**

Final Exam   Date: 22nd November 2023

Maximum marks: 50   Duration: $2\frac{1}{2}$ hours

1. **Fill in blanks:-**   **[5 x 1 = 5]**

   a. ----------------is the quality which the producer or supplier is intending to offer to the customer.
   b. ------, -----, ----- & ------ rules for brainstorming approach.
   c. ---------- model of standard for quality assurance in production & installation of manufacturing systems.
   d. Taguchi method based on --------,-------- &-------- to achieve a robust process and result for the best product quality.
   e. The famous Deming cycle is ----------, ----------, ------------, and ----------.

2. Say **True or False** with justification**:-**   **[5 x 2 = 10]**

   a. "Taguchi loss function" is used to measure the financial loss to society resulting from poor quality.
   b. Cost of maintaining attendance data in a class is example of prevention cost.
   c. A potential source of a nonconformity is eliminated through the implementation of preventive action.
   d. "Factual Approach to Decision Making" is one of the TQM principle.
   e. Dissimilarity between two products for the same characteristic is termed as variation.

3. Answer **(any two)** in detail**:-**   **[2 x 10 = 20]**

   a. Discuss the concepts of "Quality is Customer satisfaction" and bring out the differences with the concept of "Fit for use".

   b. Solve the Part-A, B & C of the below problem:
   Part-A: A manufacturer of magnetic tapes is interested in reducing the variability of the thickness of the coating on the tape. It is estimated that the loss to the consumer is $10 per reel if the thickness exceeds 0.005 ± 0.0004 mm. Each reel has 200 m of tape. A random sample of 10 yields the following thicknesses (in millimeters): 0.0048, 0.0053, 0.0051, 0.0051, 0.0052, 0.0049, 0.0051, 0.0047, 0.0054, 0.0052. Find the average loss per reel.
   Part-B: A manufacturer of magnetic tapes is interested in reducing the variability of the thickness of the coating on the tape. It is estimated that the loss to the consumer is $10 per reel if the thickness exceeds 0.005 ± 0.0004 mm. Each reel has 200 m of tape. A random sample of 10 yields the following thicknesses (in millimeters): 0.0048, 0.0053, 0.0051,

0.0051, 0.0052, 0.0049, 0.0051, 0.0047, 0.0054, 0.0052. Find the average loss per reel.

Part-C: Suppose that the manufacturer can rework the thickness prior to shipping the product at a cost of $2.00 per reel. What should the manufacturer's tolerance be?

c. Explain concept of quality functional deployment (QFD) for improving the quality of a product with a suitable example.

4. Write in **detail note** (with example) on the followings. **(Any three) [3 x 5 = 15]**

   a. Costs of Poor Quality
   b. FMEA
   c. Kano Model
   d. Quality Control Circle

-----------------------*Best off Luck*------------------------