Indian Statistical Institute Bangalore
Statistical Quality Control & Operation Research Unit
MS (QMS) First Year [Batch 2024-2025]

First Semester - **Total Quality Management**

Final Exam

Maximum Marks: 50

Date: 13th November 2024

Duration: 3 hours

1. Say **True or False (any two)** with justification:- **[2 x 2.5 = 5]**

   a. Assured quality is necessary for building customer confidence.
   b. Cost of maintaining attendance data in a class is an example of prevention cost.
   c. Dissimilarity between two products for the same characteristic is termed as variation.

2. **Fill** in the blanks **[5 x 1 = 5]**

   a. After E. Deming, who is considered to have the greatest impact in quality management_____.
   b. Elements of quality management system are _____, _____, _____.
   c. A _____ chart can be used to identify the most frequently occurring defect.
   d. Inspection of incoming/outgoing items is an example of _____.
   e. _____ QMS standard used quality assurance in final inspection and testing.

3. Answer **(any three)** in detail:- **[3 x 10 = 30]**

   a. Solve the Part-A, & B of the below problem:
   Part-A: A restaurant believes that two of the most important factors that help it attract and retain customers are the price of the item and the time taken to serve the customer. Based on the price for similar items in other neighboring restaurants, it is estimated that the customer tolerance limit for price is $8, and the associated customer loss is estimated to be $50. Similarly, the customer tolerance limit for the service time is 10 minutes for which the associated customer loss is $40. A random sample of size 10 yields the following values of price: 6.50, 8.20, 7.00, 8.50, 5.50, 7.20, 6.40, 5.80, 7.40, 8.30. The sample service times (in minutes) are 5.2, 7.5, 4.8, 11.4, 9.8, 10.5, 8.2, 11.0, 12.0, 8.5. Find the total expected loss per customer. If the restaurant expects 2000 customers monthly, what is the average monthly loss?
   Part-B: The restaurant is thinking of hiring more personnel to cut down the service time. However, the additional cost of increasing personnel is estimated to be $0.50 per customer. The results of sampling with the added personnel yield the following waiting times (in minutes): 8.4, 5.6, 7.8, 6.8, 8.5, 6.2, 6.5, 5.9, 6.4, 7.5. Is it cost-effective to add personnel? What is the total average monthly loss?

   b. Explain in detail about a quality functional deployment (QFD) for improving the quality of a product with a suitable example.

c. What did you understand about Quality Management System (QMS)? List the major objectives of ISO 9000 quality systems and explain the benefits of obtaining the ISO 9000 certification for an organization.

d. List the major QC tools and explain any two of them in detail with suitable example.

4. Write in **detail note** (with example) on the following. **(Any two) [2 x 5 = 10]**

   a. Costs of Quality
   b. FTA
   c. Kano Model
   d. FMEA

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