

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**First Semester M. Tech. Degree Examination, February 2016**

**Ernakulam II Cluster**

Branch: Mechanical Engineering

Industrial Engineering and Management

**05ME 6407 QUALITY ENGINEERING AND MANAGEMENT**

Time: Three Hours

Maximum: 60 Marks

*(Answer all questions)*

1. a. Explain the meaning of the plan–do–act–study cycle. Why is it described as a cycle? (5 marks)
- b. Think about the cost of quality. Describe the different types of cost of quality and graphically show how each type of cost would change if quality of product increases with traditional and emerging processes. (7 marks)
2. a. How would you identify the “Vital few” causes in your approach to a problem solving? (3 marks)
- b. A leading super market, just received a shipment of 1,000 torches. The sampling plan for inspecting these torches calls for a sample size  $n = 60$  and an acceptance number  $c = 1$ . The contract with the torch manufacturer calls for an AQL of 1 defective muffler per 100 and an LTPD of 6 defective mufflers per 100.
  - (i). Calculate the OC curve for this plan, and determine the producer’s risk and the consumer’s risk for the plan.
  - (ii) Suppose that the super market is using rectified inspection for its single-sampling plan. Calculate the average outgoing quality limit for a plan with  $n = 110$   $c = 3$ . (9 marks)
3. a. “The voice of the customer translated into the voice of the engineer”. Illustrate the different phases of translation process with the help of a flow diagram. (9 marks)

b. "The product should be so designed that it is immune to uncontrollable environmental factors. Because quality is the loss imparted to society from the time a product is shipped." Discuss the statement. (9 marks)

OR

4. a. The lives of three batteries with the existing design are 20, 22 and 21 hours. An experimental design produces batteries with values 17, 21 and 25 hours. Which is the better design and by how much. What is your next step? (6 marks)
- b. Narrate different steps involved in the construction of House of Quality. Describe the common difficulties associated with it. (12 marks)
5. a. "Six Sigma focuses on developing and delivering near-perfect products and services." Elaborate the statement with the help of DMAIC process improvement methodology. (9 marks)
- b. Describe the obstacles in implementing TQM? (9 marks)

OR

6. a. "Total quality management is a journey, not a destination." Comment on this statement. Explain the principles on which TQM is based. (9 marks)
- b. How does the conceptual approach to ISO 14001 differ from ISO 9001? (9 marks)