

**M.E. DEGREE EXAMINATIONS: APRIL / MAY 2010**

Second Semester

**INDUSTRIAL ENGINEERING**

IEE507: Quality Engineering

(SQC Tables are permitted to use)

**Time: Three Hours**

**Maximum Marks: 100**

**Answer ALL Questions:-**

**PART A (10 x 2 = 20 Marks)**

1. What are the Quality Objectives?
2. Define: Quality Audit.
3. What are the advantages of sampling Inspection?
4. Give the illustration of a single sampling plan.
5. Define: Factorial experiment
6. What is Taguchi quality loss function?
7. What are the advantages of Quality Circles?
8. What are the principles of TQM?
9. Define: Reliability.
10. What are the types of configuration of reliability system?

**PART B (5 x 16 = 80 Marks)**

11. (a) (i) What are the Quality Audit functions? (8)
- (ii) Explain the types of control charts. (8)

**(OR)**

- (b)  $\bar{X}$  and R Charts are to be used to control a critical dimension on a certain product using a subgroup size of 5 units. After 30 subgroups,  $\sum X = 574.5\text{mm}$ ,  $\sum R = 1.44$  mm. Calculate the values of the centre line and control limits for the X and R charts and also estimate the standard deviation  $\sigma$  for this process.

12. (a) Explain in detail the various types of sampling plans used in quality control.

**(OR)**

(b) Lots containing 1000 electric bulbs are submitted for inspection for life test. If the life of the bulb is less than 500 hours, it is considered as a defective. If a multiple sampling plan with an inspection level III and an AQL of 4 percent is to be followed, elaborate the plan for normal inspection.

13. (a) Explain the  $2^k$  design with examples.

**(OR)**

(b) Explain the step by step procedure in the effective design of an experiment.

14. (a) (i) How a Quality circle is to be launched in an organization? (8)

(ii) Write the ten TQM Commendements. (8)

**(OR)**

(b) Explain briefly the TQM Implementation.

15. (a) Two identical units each having a failure rate of 0.01 failure / hour are connected in series and parallel or in stand by configuration. For an operating period of 20 hours, calculate the reliability for series configuration and stand by arrangement. Also determine the MTBF of each arrangement.

**(OR)**

(b) A system requires a reliability of 0.95 for ten hour operating period. It consists of three units connected in series with unit failures rates as  $\lambda_1 = 0.0025$ ,  $\lambda_2 = 0.003$ ,  $\lambda_3 = 0.007$ . Allocate reliabilities to the three units in the system.

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