

Roll No. ....

Total Pages : 03

BT-7/D-18

37057

**STATISTICAL QUALITY CONTROL AND  
RELIABILITY  
ME-405E**

Time : Three Hours]

[Maximum Marks : 100

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit.

**Unit I**

1. (a) Define the term Quality. What is the role of top management in TQM ? 12
- (b) Differentiate Total Quality Control, Total Quality Management and Quality Control. 8
2. (a) Define Total Quality Management. What are advantages and obstacles of Total Quality Management implementation ? 10
- (b) What is meaning Quality of Design ? Explain the factors affecting quality of design. 10

**Unit II**

3. (a) State some of the characteristics of normal distribution. Sketch graphically  $\sigma$ ,  $2\sigma$  and  $3\sigma$  limits on a normal curve and explain their significance. 10

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P.T.O.

- (b) Compare  $\bar{X}$  chart with R charts. Discuss the circumstances in which either of the two or a combination of these will be used for the purpose of control. 10

4. Plot the control charts of  $\bar{X}$  and R, using the following sample data and a sample size of five. From the chart, find out whether the process is in control : 20

| Subgroup No. | $\bar{X}$ | R    |
|--------------|-----------|------|
| 1            | 5.004     | 0.02 |
| 2            | 5.204     | 0.08 |
| 3            | 5.014     | 0.03 |
| 4            | 5.008     | 0.05 |
| 5            | 5.009     | 0.04 |
| 6            | 5.016     | 0.09 |
| 7            | 5.030     | 0.04 |
| 8            | 5.010     | 0.04 |
| 9            | 5.016     | 0.05 |
| 10           | 5.010     | 0.07 |

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**Unit III**

5. (a) Discuss the interest of the consumer and the producer in the selection of the sampling plans. 10
- (b) Write short notes on the following : 10
  - (i) Multiple Sampling Plan
  - (ii) Sequential sampling plan. 10

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6. Differentiate between AQL and AOQL.

In a double sampling plan 2% AOQL acceptance/rectification plan :

$$N = 1000, n_1 = 32, n_1 + n_2 = 70, C_1 = 0, C_2 = 2$$

Determine

- (a) The probability of acceptance of a 2% defective lot.
- (b) The average total inspection. **20**

**Unit IV**

7. Discuss the following types of reliability systems taking suitable examples : **20**

- (a) Series system
- (b) Parallel system
- (c) Series parallel system.

8. (a) If a device has a failure rate of  $5 \times 10^{-6}$  failures per hour, what is the reliability for an operating period of 500 hours ? **6**

(b) If there are 10000 items in the test, how many failures are expected in 500 hours ? **7**

(c) If the useful life is 100000 hours, what is the reliability for operating over its useful life ? **7**

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