Code No: **R164203C** **R16** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, July - 2021

QUALITY AND RELIABILITY ENGINEERING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) Define quality value? [2]
   b) State the advantages of R-chart? [3]
   c) What are the applications of acceptance sampling? [2]
   d) What is meant by loss function? [3]
   e) List the various reliability models? [2]
   f) What is reliability of series? [2]

PART–B *(4x14 = 56 Marks)*

2. Describe about quality costs and quality improvement in detail? [14]

3. a) An ABC super store, the customer service area processes the customer returns, answer customer questions and provides information, addresses customer complaints and sells gift certificates. The manager believes that if customers must wait longer than 8 minutes to see a customer service representative they get irritated so that customer service process has been designed to achieve a customer waiting time of between 6 and 12 minutes. The store manager has conducted 10 samples of five observations each of customer waiting time over a 2 week period as follows:

Sample	Wait time (min)				
1	8.3	9.6	10.2	7.4	3.1
2	2.8	5.9	6.7	8.3	9.2
3	11.3	7.4	16.2	20.1	9.5
4	10.7	7.5	9.8	11.3	4.5
5	5.3	9.7	10.8	11.3	7.4
6	18.2	12.1	3.6	9.5	14.2
7	4.3	12.4	10.6	16.7	11.3
8	8.1	10.3	8.9	7.2	5.6
9	9.3	12.4	13.7	7.3	5.2
10	6.7	8.5	8.0	10.1	12.3

Construct an X-chart in conjunction with an R-chart to monitor customer service waiting time and comment on the capability of the service area to meet its designated goal. [8]

   b) Explain about statistical process control of p-chart. [6]

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4. a) Illustrate about the design of sampling plans? [7]
   b) Discuss about continuous sampling plans. Write its advantages. [7]

5. a) Explain the procedure for determination of tolerance to N-type, L-type and S-types. [9]
   b) Write about quality circles? Explain the methodology in implementing Quality Circles in an organization? [5]

6. a) Explain about reliability improvement in detail. [8]
   b) Discuss about failure data analysis. [6]

7. Describe about the economics of reliability engineering? [14]