Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (old) - EXAMINATION – SUMMER 2017

Subject Code:182003 Date:02/05/2017

Subject Name: Quality Assurance and Reliability

Time:10:30 AM to 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Explain the purpose of Inspection in a manufacturing company. **07**

(b) Explain sampling activity in the context of quality assurance and the risks associated with the same. **07**

Q.2 **(a)** What is Reliability? Justify the consequences of occurrence of events in context of reliability. **07**

(b) 1. Explain the three step process of quality control. **07**

2. Define total quality management (TQM) and explain it in brief.

OR

(b) In a factory producing piston rings the number of defectives found in inspection of 20 lots of 100 each is given below: **07**

Lot No.	No. of defectives	Lot No.	No. of defectives	Lot No.	No. of defectives
1	4	8	8	15	6
2	7	9	6	16	4
3	8	10	10	17	6
4	3	11	5	18	3
5	3	12	10	19	3
6	4	13	12	20	5
7	5	14	8		

Construct an appropriate control chart and state whether the process is under control or not.

Q.3 **(a)** Explain the types of control charts for attributes and variables. **07**

(b) Explain the linearly increasing hazard model in detail and derive the expressions for reliability, failure density and probability of failure for this model. **07**

OR

Q.3 **(a)** What is Pareto principle? Explain the utility of constructing Pareto diagram. **07**

(b) Explain in Brief with examples: **07**

1. Failure density **2.** Failure rate **3.** Random events

Q.4 **(a)** Explain the following ISO9001 clauses: **07**

1. Management responsibility
2. Control of customer supplied products

(b) In a capability study of a lathe used in turning a shaft to a diameter of 23.75±0.1 mm, a sample of 6 consecutive pieces were taken each day for 8 days. The data collected is as under: **07**

1st day	2nd day	3rd day	4th day	5th day	6th day	7th day	8th day
23.77	23.80	23.77	23.79	23.78	23.78	23.76	23.76
23.80	23.78	23.78	23.76	23.76	23.76	23.78	23.79
23.78	23.76	23.77	23.79	23.73	23.73	23.75	23.77
23.73	23.70	23.77	23.74	23.76	23.76	23.76	23.72
23.76	23.81	23.80	23.82	23.74	23.74	23.81	23.78
23.75	23.77	23.74	23.76	23.78	23.78	23.80	23.78

Construct the Xbar & R chart.
(D_3=0, D_4=2, A_2=0.48, d_2=2.534)

OR

Q.4 **(a)** Explain **07**

1. Taguchi philosophy
2. Six sigma

(b) Draw a 'C' chart and state whether the process is under control or not. Also determine the control limits for the future production. **07**

Lot No.	No. of defects	Lot No.	No. of defects	Lot No.	No. of defects
1	180	8	142	15	177
2	182	9	156	16	154
3	158	10	163	17	169
4	165	11	143	18	147
5	181	12	158	19	156
6	167	13	161	20	151
7	155	14	150		

Q.5 **(a)** What is quality cost? With suitable examples explain various types of quality costs. **07**

(b) Evaluate the following statements: **07**

1. All the mutually exclusive events may not be complementary events.
2. The value of reliability depends on the consequences of occurrences.

OR

Q.5 **(a)** Evaluate the statements: **07**

1. 'If all the internal customers are satisfied, there is a guarantee that the external customer would be satisfied.'

2. 'In the current competitive environment, quality is a key to success.'

(b) Explain: **07**

1. Quality of design
2. Quality of conformance.

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