

B.TECH
(SEM VIII) THEORY EXAMINATION 2022-23
QUALITY MANAGEMENT

Time: 3 Hours**Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.**2 x 10 = 20**

- (a) Differentiate between Quality of Conformance and Quality of Performance.
- (b) Differentiate between the reliability and maintainability of the product.
- (c) Explain Quality Function Deployment.
- (d) What are the basic causes of the apparatus error?
- (e) Define capability index.
- (f) What are the limitations of a basic *C-Chart*?
- (g) If 5 elements are in series and each element has a reliability of 0.55 then calculate the reliability of the combined unit.
- (h) Define MTTR.
- (i) Why tolerance in design is necessary?
- (j) What are the limitations of JIT?

SECTION B

2. Attempt any three of the following:**10x3=30**

- (a) Explain the process of evolution of the *prototype*.
- (b) Explain the economics of quality of conformance.
- (c) Explain Pareto Diagram and how it is constructed.
- (d) Explain the process of identification and analysis of defects in the product line.
- (e) Explain the concept of JIT.

SECTION C

3. Attempt any one part of the following:**10x1=10**

- (a) Enumerate the various methods of procurement of products.
- (b) Differentiate between the term warranty and guarantee. How the claims are being analyzed?

4. Attempt any one part of the following:**10x1=10**

- (a) Elaborate house of quality using a schematic diagram.
- (b) Enumerate the various steps to be taken in the planning of cost reduction programs.

5. Attempt any *one* part of the following:

10x1=10

- (a) The following data are found during the inspection of the first 15 samples of size 100 each from a lot of two-wheelers manufactured by an automobile company

| | | | | | | | | | | | | | | | |
|-------------------|---|---|---|---|----|---|---|---|---|----|----|----|----|----|----|
| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| No. of Defectives | 3 | 4 | 6 | 2 | 12 | 5 | 3 | 6 | 3 | 5 | 4 | 15 | 5 | 2 | 3 |

Draw the chart for fraction defective (p) and comment on the state of control. If the process is out-of-control, calculate the revised center line and control limits by assuming assignable causes for any out-of-control point.

- (b) Explain the central limit theorem. Enlist and explain the probability distribution used for \bar{X} , R -chart and C -Chart.

6. Attempt any *one* part of the following:

10x1=10

- (a) The probability distribution function for time to failure in years for the drive train on the Regional Transit Authority bus is given by

$$f(t) = 0.2 - 0.02t \quad 0 \leq t \leq 10 \text{ year}$$

Find:

- Reliability $R(t)$
 - The Hazard Rate Function
 - MTTF
 - MTBF
 - Compute standard deviation
- (b) The It will Failure Company manufactures gizmos for use in widgets. The time to failure of these gizmos in years has the following PDF:

$$f(t) = \frac{200}{(t+10)^3} \quad \text{for } t \geq 0$$

- Derive the reliability function and determine the reliability for the first year of operation.
- Compute MTTF
- What is the design life for a reliability of 0.95?

7. Attempt any *one* part of the following:

10x1=10

- What do you understand by documentation of quality systems in ISO 9000?
- Explain the Taguchi Method in quality engineering?