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

Time: 3 Hours

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

- (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:

- (a) Explain the process of evolution of the *prototype*.
- (b) Explain the economics of quality of conformance.
- (c) Explain Parto 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:

- (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:

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

10x3=30

10x1=10

10x1=10

 $2 \ge 10 = 20$

Total Marks: 100

6095

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

(a) The following data are found during the inspection of the first 15samples 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 *, 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 $0 \le t \le 10$ year

Find:

- i. Reliability *R*(*t*)
- ii. The Hazard Rate Function
- iii. MTTF
- iv. MTBF
- v. 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:
 - $() = \frac{1}{(1-1)}$
 - i. Derive the reliability function and determine the reliability for the first year of operation.
 - ii. Compute MTTF
 - iii. What is the design life for a reliability of 0.95?

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

10x1=10

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

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