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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 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

$f(t)= 0.2-0.02t \qquad 0 \le t \le 10$ 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:

( ) = ( ) for t≥0

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?