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Subject Code: BOE061

Roll No:

BTECH

(SEM. VI) THEORY EXAMINATION 2025-26

QUALITY CONTROL & RELIABILITY

TIME: 3 HRS

M.MARKS: 70

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

SECTION A

1. Attempt all questions in brief.

2x7 = 14

(a)	Define Quality Control and Quality Assurance.	CO1	K2
(b)	What is the difference between Mean and Median?	CO2	K2
(c)	Define Total Quality Management (TQM).	CO3	K2
(d)	What do you mean by MTTF?	CO4	K2
(e)	Write a short note on Quality Circles.	CO1	K2
(f)	Define Failure Rate.	CO4	K2
(g)	What is Six Sigma?	CO3	K2

SECTION B

2. Attempt any three of the following:

7 x 3 = 21

(a)	Explain the concept of Quality, factors influencing quality, and modern concept of Quality Control.	CO1	K3
(b)	Describe the fundamental statistical concepts used in Statistical Quality Control (Central tendency, measures of dispersion, and probability distributions).	CO2	K3
(c)	Numerical: The following data gives the number of defective items in 10 samples, each of size 100. 2, 4, 3, 1, 5, 0, 6, 2, 4, 3. Calculate the control limits for np-chart and p-chart.	CO2	K4
(d)	Explain the concept of Total Quality Management (TQM) and the role of ISO 9000 family of standards.	CO3	K3
(e)	Discuss the concepts of Reliability, MTTF, MTBF, and Failure Rate with suitable examples.	CO4	K3

SECTION C

3. Attempt any one part of the following:

7 x 1 = 7

(a)	Explain the need, benefits, and types of Quality Control. Also discuss the cost of Quality Control.	CO1	K3
(b)	Describe Inspection and Quality Characteristics. What is the role of Quality Circles?	CO1	K3

4. Attempt any one part of the following:

7 x 1 = 7

(a)	Explain the construction and applications of X-bar and R charts for a process, the grand average (X-double bar) = 50 and average range (R-bar) = 6. Calculate the control limits for X-bar and R charts (Use factors: A2 = 0.577, D3 = 0, D4 = 2.114 for n=5).	CO2	K4
(b)	Describe the theory of Control Charts for variables and attributes with their advantages and disadvantages.	CO2	K3

5. Attempt any one part of the following:

7 x 1 = 7

(a)	Explain the concept of Total Quality Management and various tools for continuous quality improvement including Six Sigma.	CO3	K3
(b)	Discuss the deployment of Quality Function and the ISO 9000 family of standards.	CO3	K3

6. Attempt any one part of the following:

7 x 1 = 7

(a)	The failure times (in hours) of 8 components are: 450, 520, 380, 600, 480, 550, 420, 500. Assuming constant failure rate, calculate the Mean Time To Failure (MTTF) and the reliability at t = 400 hours.	CO4	K4
(b)	Explain Reliability Engineering fundamentals, useful life, and the concept of Bathtub curve.	CO4	K3

7. Attempt any one part of the following:

7 x 1 = 7

(a)	Describe Reliability testing methods including accelerated life testing, temperature humidity bias test, and vibration test.	CO5	K3
(b)	Explain Reliability Management and factors influencing reliability growth.	CO5	K3