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B TECH
(SEM-VIII) THEORY EXAMINATION 2018-19
QUALITY CONTROL

Time: 3 Hours *Total Marks: 100*

Note: 1. Attempt all Sections. If required any missing data, then choose suitably.

SECTION A

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

a. What are the quality functions of quality control?
b. State the guiding principles of Total Quality Control.
c. Differentiate between discrete data and continuous data with suitable examples.
d. What is meant by natural tolerance of the process?
e. Compare random sampling and stratified sampling.
f. Write short notes on single sampling plan.
g. Define Reliability.
h. Write short notes on MTTR.
i. State the benefits of Total Quality Management.
j. State the contents of quality audit plan.

SECTION B

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

a. Explain the importance of controlling tools, gauges and test equipments in inspection planning.

b. In a capability study of a lathe used in turning a shaft to a diameter of 23.75 $\pm$ 0.1 mm a sample of 6 consecutive pieces was taken each day for 8 days, and data were recorded as given below:

Days	1	2	3	4	5	6	7	8
Mean X	23.765	23.770	23.772	23.776	23.772	23.758	23.776	23.766
Range R	0.07	0.11	0.06	0.08	0.04	0.05	0.07	0.07

Plat X and R chart and state whether the process is in control or not. Establish the process capability and compare it with the stipulated specification. Given that for a sample of size 6, $A = 0, D = 2, D = 0, d = 2.534$.

c. A known sigma variables plan for one-sided specification uses $n = 9$ and $k = 1.466$. Assuming a normal distribution and a correct estimate of σ'. What is the probability of acceptance of a 3.75% defective lot?

d. An acceptance sampling plan for life testing required that a sample of 13 items be tested with replacement for 350 hours. If not more than 3 failures occur, the lot is accepted, and otherwise it is rejected. Assume that the probability of failure is constant. Compute the mean life for which the Producer's risk of a lot rejected is 0.05. Compute the mean life for which the Consumer's risk of lot acceptance is 0.10.

e. Draw the organization for acceptance. Mention responsibilities of the chief inspector.

SECTION C

3. Attempt any *one* part of the following: 1x10 = 10

a. State the various stages which need to be controlled for ensuring proper quality of product and for ensuring improvement in quality.

b. Describe the characteristics of Just in Time production.

4. Attempt any *one* part of the following: 1x10 = 10

a. What is meant by process capability? How will you determine the same?

b. State and explain the conditions favorable for economic use of control charts for defects per unit.

5. Attempt any *one* part of the following: 1x10 = 10

a. How does the acceptance sampling by variables differ from that by attributes? Explain.

b. The single specification limit L for tensile strength of certain wire is 62kg. MIL-STD 414 is used with normal inspection code letter H, and an AQL of 1.0% variability is unknown, and the range method is to be used. A computation using the form 2 criterion is to be made. The required sample is of 25 as follows:

Subgroup 1	Subgroup 2	Subgroup 3	Subgroup 4	Subgroup 5
63	64	64	66	64
69	65	70	68	64
69	67	75	65	69
67	68	66	66	72
64	67	79	67	72

Make the necessary calculations to determine whether or not the lot should be accepted.

6. Attempt any *one* part of the following: 1x10 = 10

a. Describe "Fault Tree Analysis" briefly with a suitable example.

b. A small manufacturer of television equipment has been inspecting all the raw materials he receives. His operations are expanding and there is now some question concerning the economies of the present inspection system. It costs 3 paise to inspect one unit of raw material and if a unit of defective raw material is allowed to get production it will cost him 25 paise to repair the damage done to the equipment it is used in. What level of quality makes the present inspection system economical?

7. Attempt any *one* part of the following: 1x10 = 10

a. Describe the basic organizational structure of Quality Circles.

b. Describe the various steps necessary for obtaining ISO: 9000 standard registration.