

Sl. No. of Question Paper: 6133

Unique paper code: 2511306

Name of the paper: **Quality Control Techniques**

Name of the Department: **Instrumentation**

Name of the course: **B. Tech. Instrumentation**

Semester: **III**

F-5

INSTRUCTIONS

Attempt five questions in all.

Question No. 1 is compulsory.

Use of non-programmable scientific calculators and statistical tables is permitted.

SET B

Time: 3 hours

Max. Marks: 75

Q1. (a) Differentiate between:

- (i) Quality control and Inspection
- (ii) Single sampling plan and Double sampling plan
- (iii) AQL and RQL. (3x2=6)

b) After inspection of 20 samples each of size $n=5$, it is found that $\sum \bar{x}=306$ & $\sum R=8.80$.

If the specification limits are 15.40 ± 0.40 , then calculate $UCL_{\bar{x}}$, $LCL_{\bar{x}}$ & PCR. What conclusion can you draw if the process is in statistical control? (3)

(c) What is quality circle? What are its advantages? (3)

(d) What are the limitations of acceptance sampling over 100% inspection? (3)

Q2. (a) Explain Deming's approach to quality improvement.

(b) What is a cause-effect diagram? Draw a cause-effect diagram for problems in an educational organization.

(c) Discuss ~~the~~ various dimensions of quality. (5,5,5)

Q3. (a) In an automatic filling process 175 grams of certain chemical is to be packed in certain container. The permissible variation is ± 5 grams. To investigate the capability of a process, samples of 5 each were drawn from 10 successive batch and the following observations were made:

P.T.O

Batch	Mean, \bar{x}	Range, R	Batch	Mean, \bar{x}	Range, R
1	177	3	6	177	8
2	178	6	7	175	6
3	176	3	8	176	7
4	176	8	9	176	3
5	174	2	10	173	2

Set up an appropriate control chart. Is the process in a state of statistical control? What is the process capability for the given specification limits?

(b) Define ARL. Find ARL for the above process.

(10,5)

Q4. (a) What are the different types of control charts? Give examples to explain when to use which chart.

(b) In a factory producing spark plug, the number of defectives found in inspection of 20 lots of 100 each is given below :-

Lot No.	No. of defectives	Lot No.	No. of defectives
1	5	11	4
2	10	12	7
3	12	13	8
4	8	14	3
5	6	15	3
6	4	16	4
7	6	17	5
8	3	18	8
9	3	19	6
10	5	20	10

Construct an appropriate control chart and state whether the process is in a statistical control.

(5,10)

P.T.O

Q5. (a) What is Acceptance sampling? Discuss the advantages and disadvantages of sampling.

(b) Design a single sampling plan, which will meet the following requirements:

$$p_1 = 0.09, p_2 = 0.05$$

$$\alpha = 0.05, \beta = 0.10 \quad (5, 10)$$

Q6. (a) Describe the basic organizational structure and process involved in operation of Quality Circles. Also, give the advantages and limitations for quality circles.

(b) Suppose that a single sampling plan with $n = 100$ and $c = 2$ is being used for receiving inspection where the vendor ships the product in lots of size $N = 10000$. Draw the OC-curve for this plan.

(c) Draw the AOQ curve and find AOQL for the OC curve plot in part (b).

(5, 5, 5)

Q7. (a) Discuss the importance of leadership in effective implementation of ISO.

(b) Explain ISO 14000 series and what are the benefits of Environmental management system.

(8, 7)
