MODEL SOLUTION

SESSIONAL TEST-2

Name of Subject: Quality Management Subject CODE: NOE-072

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Section-A

Ques-1 What are UCL and LCL?

Ans- UCL represents upper control limit on a control chart, and LCL represents lower control limit. The UCL and LCL on a control chart indicate whether any variation in the process is natural or caused by a specific abnormal event that can effect the quality of the finished product.

$$UCL = \mu + n\sigma$$

$$LCL = \mu - n\sigma$$

Ques-2- What do you understand by Quality costs?

Ans- The cost of quality is not the price of creating a quality product. Infact it's the cost of not creating a quality product or service. Every time work is redone the cost of quality increases.

Quality control are four types

(1)- Prevention Costs

(2)- Appraisal Costs

(3)- Failure Costs

(4)- Internal or External Failure Costs

Ques-3 What are control charts for variables and attributes?

Ans- Quality characteristics such as diameter, tensile, strength, length, volume and temperature bear a numerical value and are called variables.

Control chart for attributes-

There are some characteristics that cannot be represented numerically.

There are 3 types of control charts for attribution -

There are -

(1)-P charts

(2)-C charts

(3)-U charts

Ques 4 - what are different types of organizational structure -ures?

Ans- Pre-bureaucratic structures

(1)- Bureaucratic structures

(2)- Post-bureaucratic

(3)- Functional structure

(4)- Divisional structure

(5)- Matrix structure

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Ques 5- what is Quality of conformance?

Ans- Quality of conformance implies that the manufactured product or the service rendered must meet the Standards set in the design phase. In other words, quality of conformance is the degree to which products design and operating characteristics must be established Standards or design specifications. It is concerned with how well the manufactured product conforms to quality of design. It consists of three broad areas of defect prevention, defect finding and defect analysis and rectification.

Section-B

Ques-6 Explain quality functions?

Ans- The quality function in a manufacturing organization can be categorized as-

(1) Quality Engineering functions
(2)- Quality control functions
(3)- Quality Engineering function

It includes all activities concerned with developing, defining and planning for quality in the pre-production stage.

(2). Quality control function –

It is concerned with implementing quality improvement plans. It includes in-process and post-production testing so as to ensure quality of conformance. Some task included in this category are –

(1). Establishing quality checks at various points of manufacturing process.

(2) Calibration and maintenance of inspection and control equipment.

(3) Investigation of defects.

(4) Final inspection of end products.

Ques-7- Briefly describe about Control chart for percent defectives?

Ans –

$$\text{Fraction defective} = \frac{\text{No. of units found defective}}{\text{Total number of units inspected}}$$

$$\%\text{ defective} = \text{fraction defective} \times 100$$

for complex equipment – $\text{defect percent} = \frac{\text{Total No. of defects observed}}{\text{No. of units inspected}}$

$$\text{defects per 100 units} = \text{defects per unit} \times 100$$

The proportion non conforming defined as – $\hat{p} = \frac{x}{n}$ $n \rightarrow$ sample size

From the binomial distribution

$$P(X = x) = \frac{\lfloor n}{\lfloor n-x \lfloor x} p^x (1-p)^{n-x} \quad x = 0, 1, \ldots n$$

The mean of the sample proportion non conforming is

$$E(\hat{p}) = p$$

$$\text{var}(\hat{p}) = \frac{p(1-p)}{n}$$

Que-8 Explain different types of Quality costs?

Ans- Quality costs are four types-

(1)- Prevention Costs- These are the costs of all activities specifically designed to prevent poor quality in products or services.

Exp of prevention costs are-

(1)- New product review

(2)- Quality Planning

(3) Supplier capability surveys

(4)- Process capability evaluations

(2)- Appraisal Costs- These are the costs associated with measuring, evaluating or auditing products or services to assure conformance to quality standards and performance requirements. These include the costs of-

(1). Incoming and source inspection test of purchased material.

(2). In-process and final inspection.

(3). Product, process or service audits.

(3)- Failure Costs- Failure costs are the costs resulting from products or services not conforming to requirements of the customer.

Failure costs are two types

(1)- Internal failure costs

(2)- External failure costs

(8)- Internal and External failure -

Internal failure costs arise from defects caught internally and deal with by discarding or repairing the defective items.

⇒ External failure costs arise from defects that actually reach customers.

Ques-9- How does quality management affected by human factors?

Ans- The man power is the most important aspect in any organization in this world. NO organization runs without manpower.

(1)- Attitude Of Top Management - As quality management in India is not very conventional and old hence not everyone understands the importance of Quality management. Management doesn't only scrutiny or monitor the things rather it manipulates and get the latter O/P by their positive attitude.

(2) Co-operation of other functional Groups-

Let us suppose a concrete plan has been discussed and about to be implemented by the Top Management as discussed earlier, but this talking and thinking of implementation does not guarantees the success of the objective.

(3)- Attitude Of Operaters- Operaters are defined as the most important person who builts quality into the product.

(4)- Operater responsibility for Quality - Responsibility of the quality of product is on the team management and other staff, from engineer to the other lower level of

-workers, but the overall responsibility is on the operato
-rs.

Ques-10- Discuss specific benefits and applications of control charts?

Ans- (1)- Control charts shows when a process is out of control and when a corrective action is required.

(2)- The pattern of plot obtained on a control chart indicated the possible causes of variation and the type of remedial action needed.

(3)- It is not possible, neither is it recommended to eliminate all causes of variation. By means of control chart, we come to know when a variation is normal and inherent to the process so that no corrective action is required. In other words, it tells us when to leave a process alone.

(4)- Control chart provides a basis for implementing and measuring quality improvement activities. They provide useful information to decide the action required for quality improvement.

(5)- Control charts can be used as an aid for process design as well as the product design.

Section-C

Ques-11- Discuss various factors influencing the designing of the quality organisation structure and human factors in quality control of a product?

Ans- The choice of an appropriate organization design is dependent on a number of factors. These factors can be internal or external. However the main factors affecting organizational design are- Size, environment, Strategy and technology.

Organizational design is the process of deciding on and executing a business structure.

(1)- Strategy and organization design- Organizational Strategy means the way the business position itself in it setting in relation to its stakeholders, given the organizations resources, capabilities and mission.

(2)- Size and organization design- Size is one of the primary contingency factors that affect organizational design. The size contingency means the total number of members who are to be organized.

(3)- Environment affects organizational design- Organization are open systems so they have to receive different inputs from the environment and to sell a variety of outputs to their env. As a result, it is crucial to comprehend what the external env. is and which elements are likely to be significant

Human factors in quality control of a product -

Quality control involves operational techniques and activities aimed both at monitoring a process and at eliminating causes of unsatisfactory performance at relevant stage of the quality loop in order to result in economic effectiveness.

Ques-12 calculate the limits and draw X chart for the following data.

Sample	X_1	X_2	X_3	X_4	X_5	X_6	$\bar{X}$	R
1	3	4	5	5	5	6	4.7	3
2	3	4	5	6	7	7	5.3	4
3	6	6	7	7	7	8	6.8	2
4	6	7	8	8	8	10	7.8	4
5	7	7	8	9	10	12	8.8	5
6	6	8	8	8	8	10	8.0	4
7	8	9	10	11	12	14	10.7	6
8	7	9	9	10	11	13	9.8	6
9	11	12	13	13	14	14	12.8	3
10	13	14	14	15	16	17	14.8	4

Use $D_4 = 2.004$, $D_3 = 0$, $D_2 = 2.534$ for 10 no. of samples.

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Solution :

$$\sum \bar{X} = 89.5 \quad , \quad \sum R = 41$$

$$\bar{\bar{X}} = 8.95 \quad , \quad \bar{R} = 4.1$$

For $\bar{X}$ chart

$$UCL = \bar{\bar{X}} + A_2 \bar{R}$$

$$= 8.95 + 0.483 \times 4.1$$

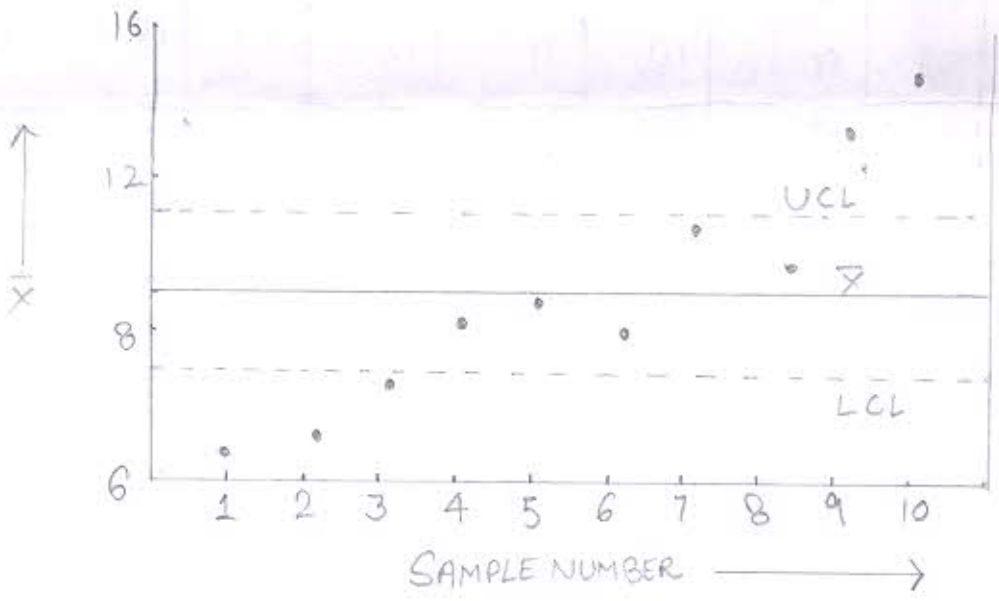
$$= 10.93$$

$$LCL = \bar{\bar{X}} - A_2 \bar{R}$$

$$= 8.95 - 0.483 \times 4.1$$

$$= 6.97$$

Whereas, $A_2 = \frac{3}{d_2 \sqrt{n}}$



$\bar{X}$ CHART