

UNIT- IV
STATISTICS PROCESS CONTROL

1. Mention the seven basic tools involved in statistic quality control.

The seven tools involved in statistical quality control. They are,

- a. Pareto diagram
- b. Check sheet
- c. Cause and effect diagrams
- d. Scatter diagram
- e. Histogram
- f. Control charts
- g. Graphs

2. What is Pareto chart?

A Pareto chart is a special form of a bar graph and is used to display the relative importance of problems or conditions.

3. Give some applications of Pareto chart.

The applications of Pareto chart are,

- a. Focusing on critical issues by ranking them in terms of importance and frequency (Example: which course causes the most difficulty for students?; which problem with product X is most significant to our customers?)
- b. Prioritizing problems or causes to efficiently initiate problem solving (Example: which discipline problems should be tackled first? or what is the most frequent complaint by parents, regarding the school? solution of what production problem will improve quality most?)

4. What is scatter diagram?

A scatter diagram is used to interpret data by graphically displaying the relationship between two variables.

5. What are the new seven management tools?

- i. Affinity Diagram
- ii. Interrelationship Digraph
- iii. Tree Diagram
- iv. Matrix Diagram
- v. Prioritization Matrices
- vi. Process Decision Program Chart
- vii. Activity Network diagram

6. Give the usage of C&E diagrams?

1. Analyze actual conditions for the purpose of product or service quality improvement, more efficient use of resources, and reduced costs.
2. Eliminate conditions causing nonconformities and customer complaints.
3. Standardize existing and proposed operations.

4. Educate and train personnel in decision-making and corrective-action activities.
- 5.

7. Define Six Sigma?

Six-Sigma is a business process that allows organizations to drastically improve their bottom line by designing and monitoring every day business activities in ways that minimize waste and resources while increasing customer satisfaction. It is achieved through continuous process measurement, analysis & improvement.

8. What are the various histogram shapes?

** Symmetrical * Skewed right * Skewed left * Peaked * Flat * Bimodal * Plateau distribution * Comb distribution * Double peaked distribution*

9. What are the various patterns of scatter diagrams?

- Positive correlation
- Negative correlation
- No correlation
- Negative correlation may exist
- Correlation by stratification
- Curvilinear relationship

10. What is the procedure for constructing the tree diagram?

Choose an action oriented objective statement from the interrelationship diagram, affinity diagram, brainstorming, team mission statement, and so forth.

Using brainstorming, choose the major headings. Generate the next level by analyzing the major headings.

11. Give at least five standard formats of matrix diagram?

L-shaped T-shaped Y-shaped C-shaped X-shaped

12. What are the benefits of an activity network diagram?

A realistic timetable determined by the users. Team members understand the role in the overall plan. Bottlenecks can be discovered and corrective action taken. Members focus on the critical tasks.

13. Define Benchmarking?

Benchmarking is a systematic method by which organizations can measure themselves against the best industry practices. The essence of benchmarking is the process of borrowing ideas and adapting them to gain competitive advantage. It is a tool for continuous improvement.

14. Enumerate the steps to benchmark?

- a) Decide what to benchmark
- b) Understand current performance
- c) Plan
- d) Study others
- e) Learn from the data
- f) Use the findings

15. What are the types of benchmarking?

- i. Internal
- ii. Competitive
- iii. Process

16. What is a QFD?

Quality Function Deployment is a planning tool used to fulfill customer expectations. It is a disciplined approach to product design, engineering, and production and provides in-depth evaluation of a product.

17. What are the benefits of QFD?

- i. Customer driven
- ii. Reduces implementation time
- iii. Promotes teamwork
- iv. Provides documentation

18. What are the steps required to construct an affinity diagram?

- i. Phrase the objective
- ii. Record all responses
- iii. Group the responses
- iv. Organize groups in an affinity diagram

19. What are the parts of house of quality?

- i. Customer requirements
- ii. Prioritized customer requirements
- iii. Technical descriptors
- iv. Prioritized technical descriptors
- v. Relationship between requirements and descriptors
- vi. Interrelationship between technical descriptors

20. How will you build a house of quality?

- a) List customer requirements
- b) List technical descriptors
- c) Develop a relationship matrix between WHATs and HOWs
- d) Develop an interrelationship matrix between HOWs
- e) Competitive assessments
- f) Develop prioritized customer requirements
- g) Develop prioritized technical descriptors

21 Define FMEA?

Failure Mode Effect Analysis is an analytical technique that combines the technology and experience of people in identifying foreseeable failure modes of a product or process and planning for its elimination.

22. What are the stages of FMEA?

- 1. Specifying possibilities
 - a. Functions
 - b. Possible failure modes
 - c. Root causes
 - d. Effects
 - e. Detection/Prevention

2. Quantifying risk
 - a. Probability of cause
 - b. Severity of effect
 - c. Effectiveness of control to prevent cause
 - d. Risk priority number
3. Correcting high risk causes
 - a. Prioritizing work
 - b. Detailed action
 - c. Assigning action responsibility
 - d. Check points on completion
4. Reevaluation of risk
 - a. Recalculation of risk priority number

23. What are the goals of TPM?

The overall goals of Total Productive Maintenance, which is an extension of TQM are

- i. Maintaining and improving equipment capacity
- ii. Maintaining equipment for life
- iii. Using support from all areas of the operation
- iv. Encouraging input from all employees
- v. Using teams for continuous improvement

24. Give the seven basic steps to get an organization started toward TPM?

- a) Management learns the new philosophy
- b) Management promotes the new philosophy
- c) Training is funded and developed for everyone in the organization
- d) Areas of needed improvement are identified
- e) Performance goals are formulated
- f) An implementation plan is developed
- g) Autonomous work groups are established

25. What are the major loss areas?

- i. Planned downtime
- ii. Unplanned downtime
- iii. Idling and minor stoppages
- iv. Slow-downs
- v. Process nonconformities
- vi. Scrap

26. What are the generic steps for the development and execution of action plans in benchmarking?

- “ Specify tasks.
- “ Sequence tasks.
- “ Determine resource needs. “ Establish task schedule.
- “ Assign responsibility for each task. “ Describe expected results.
- “ Specify methods for monitoring results.

27. What are the phases of QFD process?

- I. Product planning
- ii. Part development
- iii. Process planning

iv. Production planning

28. What are the several types of FMEA?

Design FMEA
Process FMEA Equipment FMEA Maintenance FMEA
Concept FMEA
Service FMEA System
FMEA
Environment FMEA etc.

29. Define TPM?

Total = All encompassing by maintenance and production individuals Working together.
Productive = Production of goods and services that meet or exceed customer's Expectations.

Maintenance = Keeping equipment and plant in as good as or better than the original Condition at all times.

30. What is line graph?

A line graph is a way to summaries how two pieces of information are related and how they vary depending on one another. The numbers along a side of the line graph are called the scale.

31. What is an arrow diagram?

An arrow diagram is another term for a PERT or CPM chart. It is graphic descriptions of the sequential steps that must be completed before a project can completed.

32. Give some applications of arrow diagram.

The applications of arrow diagram are,

- a. Understanding and managing complex project or task.
- b. Understanding and managing a project that is of major importance to the organization, and the consequences of late completion are sever.
- c. Understanding and managing a project in which multiple activities must take place and be managed simultaneously.
- d. Explaining the project status to others.

33. What is nominal group technique?

The nominal group technique is a structured process, which identifies and ranks the major problems or issues that need addressing.

PART B

1. Discuss about design of FMEA document.
2. Explain briefly above the “bench marking process” ?

3. Explain the different types of needs
4. Explain the Taguchi's Quality Loss Function
5. What are the major benefits of quality function deployment (QFD).
6. What is TPM philosophy. Explain the various steps of TPM
7. What are the Phases of QFD?