UNIT-I

1. Define Quality.

A. 1. Fitness for intended use. (Joseph Juran). 2. Conformance to specifications. (Philip Crosby). 3. The totality of features of a product or service that bears on its ability to satisfy a stated or implied need. (American Society of Quality).

2. Define Total Quality Management.

A. 1. The art of managing the total organization to achieve excellence in all spheres of activity.(Besterfield). 2. The integration of all functions and processes within an organization in order to achieve the continuous improvement of the quality of goods and services. (Omachonu).

3. Mention the basic features of TQM.

A. 1. Management commitment, 2. Focus on customer (both external and internal), 3. Employee involvement, empowerment, 4. Continuous improvement, 5. Treating suppliers as partners, and 6. Establish performance measures for processes.

4. What are the major benefits of TQM?

A. Improved quality, higher productivity, employee participation, teamwork, working relationships, customer satisfaction, employee satisfaction, communication, profitability, market share, and stock price performance.

5. What are some major obstacles to TQM implementation?

A. Lack of management commitment, Inability to change organizational culture, Improper planning, Lack of continuous training and education, Paying inadequate attention to internal and external customers, Inadequate use of empowerment and teamwork, Lack of employee involvement, Emphasis on short-term results, etc.

6. What are the various quality statements?

A. The quality statements include the vision statement, mission statement, and quality policy statement.

7. What is a Vision statement?

A. A short declaration of what an organization aspires to be in the future. It is an ideal state that an organization continually strives to achieve. It is timeless, inspirational, and becomes deeply shared within the organization.

8. What is a Mission statement?

A. The mission statement answers the following questions: who we are, who are our customers, what we do, and how we do it. The mission provides the guide map, milestones for achieving the vision.

9. What is the importance of customer focus for an organization?

A. Customers are the most important asset of an organization. An organization's success depends on how many customers it has, how much they buy, how often they buy, and how long they are retained (loyalty).

10. Distinguish between 'internal customer' and 'external customer'.

A. An *external customer* exists outside the organization and can be defined in many ways – user, buyer, influencer. He generally falls into one of three categories: current, prospective, or lost customer. Every function within the organization – engineering, production, order processing, etc. – has an *internal customer*. Every person in a process is considered a customer of the preceding

operation. For example, Manufacturing is a customer for Purchasing, and Dispatching is a customer for Packaging.

11. What are the three levels of quality in the Kano model of customer satisfaction?
A. (i) Basic quality, (ii) Performance quality, and (iii) Excitement quality. The products corresponding to these three quality levels were termed as 'Dissatisfiers', 'Satisfiers' and 'Delighters/Exciters' respectively in the Kano model.

12. What is importance of customer retention?
A. It costs a company six times more to sell a product to a new customer than it does to sell to an existing one. Loyal customers generate more revenue, and are also cheaper to maintain. Customer loyalty facilitates cross-selling/up-selling of a company's other products/services, and also acts as an effective barrier to the entry of competition.

13. What are the major dimensions of product quality?
A. Performance, features, usability, conformance to standards/specifications, reliability, durability, maintainability, etc.

14. What are the major dimensions of service quality?
A. Service duration, timeliness, completeness, consistency, convenience, accuracy, courtesy, etc.

15. What is meant by 'Cost of quality'?
A. Quality costs are defined as costs associated with non-achievement of product/service quality. In simple terms, quality cost is the cost of poor products/services. All costs associated with poor quality and its correction are integrated into one system to enhance the quality management function.

16. What are the four categories of quality costs?
A. 1. Prevention costs, 2. Appraisal costs, 3. Internal failure costs, and 4. External failure costs.

17. What are internal failure costs?
A. These are costs required to identify, repair, replace, or dispose off defective products/services prior to delivery to the customer.

18. Mention the names of some major contributors to the quality movement.
A. Edwards Deming, Joseph M. Juran, Philip Crosby, Feigenbaum, Ishikawa, Taguchi, Shingo, Walter Shewhart, etc.

19. What is Deming Cycle?
A. P-D-S-A (Plan-Do-Study-Act) cycle of continuous improvement.

20. What is Deming's "System of Profound Knowledge"?
A. Deming summarized his philosophy in what he called "A System of Profound Knowledge". It comprised of 4 parts: (1) appreciation for a system, (2) some knowledge of the theory of variation, (3) theory of knowledge, and (4) psychology. Deming recognized the synergy among these diverse subjects and developed them into a theory of management.

UNIT-II

1. Why should suppliers be treated as partners?
A. Costs due to inferior materials/components from suppliers increase costs in the later stages of production. Suppliers themselves are part of the whole system and hence should be treated as long-term partners.

2. What is the 'Juran Trilogy' ('Quality Trilogy')? (Dec 2011)
A The **Juran Trilogy (Quality Trilogy)** consists of three inter-related processes – quality planning, quality control, and quality improvement – for managing quality.

3. What are Crosby's Four Absolutes of Quality Management?
A. (1) Quality means conformance to requirements, not elegance. (2) Quality is achieved by prevention, not appraisal. (3) The performance standard is zero defects, not acceptable quality levels. Quality is free. (4) Quality is measured by the price of non-conformance, not indexes.

4. Mention the major contribution of Feigenbaum to quality.
A. He was the originator of the concept of **Total Quality Control (TQC).** His concept of *Total Quality Control* was used as the foundation by the Japanese for their practice called *'Company-Wide Quality Control' [CWQC]* which began in the 1960s and later evolved into TQM.

5. What are Quality Circles (QC)?
A. QC is a small team of people (around 8 to 10) coming from the same work area/department who voluntarily meet on a regular basis (about an hour every week) to identify, investigate, analyze and solve work-related problems. QC can be viewed from three angles: (i) as a form of participative management, (ii) as a HRD technique, and (iii) as a problem-solving technique.

6. What are the roles assigned to people in Quality Circles?
A. The QC organization has a four-tier structure consisting of *Members, Leaders, Facilitators, and Steering Committee.*

7. What are the steps in implementing Quality Circle projects?
A. (1) Select the problem, (2) Study the problem, (3) Plan the improvement, (4) Carry out the improvement, (5) Check the results, (6) Form conclusions, (7) Present to management, (8) Obtain approval, and (9) Implement on regular basis.

8. Mention some tools used by Quality Circles for solving problems.
A. Data collection, Brainstorming, Check sheets, Pareto Analysis, Cause & Effect diagrams, Control charts, Presentation techniques, etc. are used by quality circles in solving problems.

9. Mention some major objectives of Quality Circle projects.
A. 1. Improve quality and productivity. 2. Cost reduction. 3. Effective utilization of resources.
4. Avoid unnecessary errors, defects. 5. Solve work-related problems that interfere with production, etc.

10. What are the Japanese 5S principles? (Dec 2011)
A. The 5S's stand for five Japanese words: **Seiri, Seiton, Seiso, Seiketsu,** and **Shitsuke.** In English, they mean ***Sort, Arrange, Clean up, Systematize,*** and ***Discipline*** respectively.

11. What does Seiri mean?
A. Separate out all unnecessary things and remove them, retaining only necessary things.

12. What does Seiton mean?
A. Put required things in proper order so that they can be easily accessed for use and quickly put away in their proper locations after use.

13. What does Seiso mean?
A. Keep machinery and work environment clean.

14. What does Seiketsu mean?
A. Develop routine practices for orderly, systematic working.

15. What does Shitsuke mean?
A. Impart systematic training and coaching to ensure discipline in 5S implementation.

16. Mention some benefits of implementing 5S principles.
A. 5S increases productivity, eliminates waste, reduces inventory, creates a pleasant workplace, improves safety, and increases the overall efficiency and effectiveness of people and machines.

17. Explain Kaizen (Dec 2011)
Kaizen, which is a Japanese word that means gradual and orderly continuous improvement, is a philosophy that covers all business activities and everyone in an organization. In the kaizen philosophy, improvement in all areas of business – cost, meeting delivery schedules, employee safety and skill development, supplier relations, new product development, and productivity – serve to improve the quality of the firm. Thus, any activity directed toward improvement falls under the kaizen umbrella.

18. Explain Supplier Rating.
A supplier rating system (often called a scorecard system) is usually based on quality, delivery, and service; however, some customers have added other categories, such as lead time, product support, technology, etc.

19.Define Empowerment
Empowerment requires *a sincere belief and trust in people.* It involves employees directly in decision-making processes, giving them the security and confidence to make decisions, and providing them with the necessary tools and training.

20. Distinguish between Reward and Recognition. (Dec 2010)
Recognition & reward: Creating incentives for suppliers is one way to ensure that they remain committed to a quality improvement strategy. Incentives may be in the form of a preferred supplier category with its rewards. Recognition may be in the form of publication of outstanding contributions in the customer's newsletter, a letter of commendation, or a plaque.

UNIT – III

TQM TOOLS & TECHNIQUES I

PART - A

1. List the seven tools of quality.

1. Check sheets.
2. Histograms.
3. Cause and effect diagrams.
4. Pareto diagrams.
5. Stratification analysis.
6. Scatter diagrams, and
7. Control charts.

2. What is check sheet?

A check sheet or tally sheet is a form for systematic data gathering and registering to get a clear view of the facts.

3. When do you use the check sheet?

A check sheet is used to indicate the frequency of a certain occurrence.

4. What are the types of check sheets commonly used?

1. Process distribution check sheet.
2. Defective item check sheet.
3. Defect location check sheet, and
4. Defect factor check sheet.

5. What is histogram?

A histogram is a bar chart / diagram showing a distribution of variable quantities or characteristics. It is graphical display of the frequency distribution of numerical data.

6. When do you use histogram?

A histogram is used to show clearly where the most frequently occurring values are located and the data is distributed.

It enables the analyst to quickly visualize the features of a complete set of data.

7. What are the various types of histogram?

1. Bell-shaped.
2. Double-peaked.
3. Plateau.
4. Comb.
5. Skewed.
6. Truncated.
7. Isolated peak and
8. Edged peak.

8. What is cause and effect diagram?
The cause and effect diagram or Fishbone diagram is a graphical-tabular chart to list and analyze the potential causes of a given problem.

9. Under what situations, one can use cause and effect diagram?
The cause and effect diagram has unlimited application in research manufacturing, marketing, office operations, services, etc.

10. What are the uses of CE diagram?
The cause and effect diagrams are used:
To analyse cause and effect relationships
To facilitate the search for solutions of related problems.
To standardize existing and proposed operations and
To educate and train personnel in decision-making and corrective action activities.

11. What is Pareto diagram?
A pareto diagram is a diagnostic tool commonly used for separating the vital few causes that account for a dominant share of quality loss.

12. State the Pareto principle.
Pareto principle states that a few of the defects accounts for most of the effects.

13. What are the purposes of pareto principle.
Pareto analysis can be used in a wide range of situations, where one need to priorities problems based on its relative importance.

14. What is stratification?
Stratification is a method of analysis of data by grouping it in different ways.

15. What is scatter diagram?
The scatter diagram is a simple graphical device to depict the relationship between two variables.

16. When do you use the scatter diagram?
The purpose of the scatter diagram is to display what happens to one variable when another variable is changed.

17. What is control chart?
A control chart is a graph that displays data taken over time and the variation of this data.

18. What are the types of control charts?
Control charts for variables – for measurable data such as time, length, temperature, weight, pressure, etc.

Control charts for characteristics- for quantifiable data such as number of defects, typing errors in a report, etc.

19. When do you use control chart?
The purpose of control chart is to identify when the process has gone out of statistical control, thus signaling the need for some corrective action to be taken.

20. Define statistics applications of statistical techniques?
Statistics is defined as the science that deals with the collection, tabulation, analysis, interpretation and presentation of quantitative data.

21. What are major functions of statistical analysis? Write down the applications of statistical techniques?
The major functions of statistical analysis are:
Reducing the complexity of the situation,
Making comparisons and drawing conclusions,
Estimating and predicating, and
Decision-making.
Statistical techniques are applicable in all situations where quantification is possible. The statistical analysis has become indispensable to practically every field that exists.

22. What are the types of graphs used in representing frequency distribution?
Histogram,
Frequency polygon and frequency curve, and
Cumulative frequency or the 'Ogive'

23. How do obtain frequency curve?
A frequency curve is obtained by drawing a smooth freehand curve through the points of the frequency polygon. The cumulative frequency curve (also called an Ogive) obtained by plotting upper class limits (or lower class limits) against the 'less than' (or 'more than') cumulative frequencies is known as 'less than' Ogive (or 'more than' Ogive).

24. What do you mean by measure of central tendency? What are the three measures of central tendency?
A measure of central tendency of a distribution is a numerical value that describes the central position of the data.
1. Mean, 2, Median, and 3. Mode.

25. What are the three measures of dispersion?
Measures of dispersion tell us how the individual observations are spread on either side of the centre.
1. Range, 2.Mean deviation, and 3. Standard deviation

26. What is meant by attribute? What is the use of control charts for attributes?
An attribute refers to those quality characteristics that confirm to specifications or do not conform to specifications.
Control charts for attributes monitor the number of defects or fraction defects or fraction defect rate present in the sample.
p chart: The chart for fraction rejected as non-conforming to specification
np chart: The control chart for number of non-conforming items.
c chart: The control chart for number of defects.
u chart: The control chart for number of defects per unit.

27. Define fraction defective (p).

It is defined as the ratio of the number of defective articles found in any inspection to the total number of articles actually inspected.Mathematically, p = np/n

Where P= Fraction defective, np = Number of defectives, and n = Number of items inspected in the sub-group

28. When up chart is preferred over p chart? Why a np chart is preferred over p chart?

When subgroup size is constant, the np chart is preferred over p chart.

In np chart, when the subgroup size is variable, the expected number of rejectable items per subgroup will also change. This means that a different central line as well as different control limits for every subgroup on the chart. This makes the chart very confusing and almost not understandable by shop personnel. Therefore when the subgroup size is variable, np chart is not recommended.

29. Write down the difference between a defect and defective.

An item is said to be defective if it fails to conform to the specifications in any of the characteristics. Each characteristics that does not meet the specifications is called defect. For example, if a casting contains undesirable hard sports, below holes, etc., the casting is defective and the hard spots, below holes, etc., are the defects.

30. Differentiate between producer's risk and consumer's risk.

Producer's risk: It is the probability of rejecting a good lot which otherwise would have been accepted.

Consumer's risk: It is the probability of accepting a defective lot which otherwise would have been rejected.

31. What is six sigma?

Six sigma is similar to Zero Defects (ZD), is a philosophical benchmark or standard of excellence proposed by Philip Crosby. Six sigma strives for perfection. It allows for only 3.4 defects per million opportunities (or 99.99966 percent accuracy).

32. What are the five phases in six sigma process?

The five phases in six sigma process are:

1. Define, 2. Measure, 3. Analyse, 4. Improve, and 5. Control

33. Brief the scope of six sigma principle.

The six sigma concept is originated from manufacturing field. Now it is applied to non-manufacturing processes also. Today one can apply six sigma to many fields such as services, medical and insurance procedures, call centres, etc.

Unit-IV

1. What are the various approaches to improving reliability of a product?
A. Standardization, redundancy, over-design, de-rating, design simplification, understanding the physics of failure, burn-in, and Failure Mode and Effect Analysis (FMEA).

2. What is Product Life Characteristics Curve?
A. The failure rate curve, called the *product life characteristics curve*, shows the failure rates (failures per unit time) against time. It is also called as *bathtub curve* because of its shape.

3. What are the three stages shown on a Product Life Characteristics Curve?
A. The curve consists of three distinct stages: Early failure ('infant mortality' or 'debug'), useful life ('normal failure' or 'chance') and wear out ('old age') failure. The curve shows that the failure rates are higher at the early and end stages of a product's life and relatively low in between the two extremes.

4. What is the usefulness of the Product Life Characteristics Curve?
A. Knowing the product life characteristics curve for a particular product helps engineers predict failure behavior and take suitable decisions.

5. What is the essential feature of Total Productive Maintenance (TPM)?
A. TPM is keeping plant and equipment at their highest productive level through cooperation of all areas of the enterprise. TPM brings maintenance into focus as a necessary and vital part of the business. It is not regarded as a non-profit activity. Down time for maintenance is scheduled as an integral part of the manufacturing process.

6. What are the overall goals of TPM (nov/dec 2008)?
A. The overall goals of TPM are: Maintaining and improving equipment capacity. Maintaining equipment for life. Using support from all areas of operation. Encouraging inputs from all employees. Using teams for continuous improvement.

7. What are the different ways of classifying maintenance activities?
A. Maintenance activities can be classified in various ways:
* ***Planned (or preventive) maintenance*** vs. ***Unplanned (or breakdown) maintenance***
* ***Preventive maintenance*** can be sub-classified into *Periodic maintenance and Predictive maintenance*
* ***Running maintenance*** vs. ***Shutdown maintenance***
* ***Time-based maintenance*** vs. ***Condition-based maintenance***

8. What is some performance measures used to assess the success of TPM?
A. Mean Time Between Failures (MTBF), Mean Time To Repair (MTTR), Availability (A), Reliability (R), Maintainability (M), Rate efficiency (RE), Speed efficiency (SE), Performance efficiency (PE), Quality rate (Q), and Overall Equipment Efficiency (OEE).

9. What are the eight pillars of TPM?
A. The eight pillars of TPM are: *[1] 5S, [2] Jishu Hozen (Autonomous Maintenance), [3] Kobetsu Kaizen (KK), [4] Planned Maintenance (PM), [5] Quality Maintenance (QM), [6] Training, [7] Office TPM, and [8] Safety, Health and Environment.*

10. What are the three categories of losses identified in TPM?
A. (A) Losses that impede equipment efficiency (B) Losses that impede human work efficiency and (C) Losses that impede effective use of production resources.

11. What is Office TPM?
A. Office TPM is aimed at improving quality, productivity and efficiency in the administrative functions and identifying and eliminating losses.

12. What is Business Process Reengineering (BPR)?
A. The fundamental rethinking and radical redesign of business processes to improve performance dramatically in terms of measures like cost, quality, service, and speed.

13. What are some key requirements for success in BPR implementation?
A. The key requirements for success in BPR are: (a) fundamental understanding of processes, (b) creative thinking, and (c) effective use of information technology.

14. Distinguish between Kaizen and BPR.
A. Kaizen involves incremental improvements, whereas BPR involves breakthrough improvements. Both are essential for successful implementation of TQM.

15. What are the seven principles of reengineering?
A. 1. Organize around outcomes, not tasks, 2. Those who use the output of the process must perform the process, 3. Merge information processing work into the real work that produces the information, 4. Treat geographically dispersed resources as though they are centralized, 5. Link parallel activities instead of integrating their results, 6. Put the decision point where the work is performed, and 7. Capture information once – at the source.

16. Mention the major steps in BPR implementation.
A. 1. Develop business vision and process objectives. 2. Study the existing procedures. 3. Identify the process for reengineering. 4. Identify customer requirements. 5. Understand the current process. 6. Identify gaps between current process and customer requirements. 7. Evaluate enablers (organizational issues, information technology). 8. Develop improved process. 9. Develop action plan for implementation. 10. Implement the reengineered process. 11. Follow up.

17. What are some factors affecting the success of BPR implementation?
A. (i) Critical/core processes, (ii) Strong leadership, (iii) Cross-functional teams, (iv) Information technology, (v) 'Clean slate' philosophy, and (vi) Process analysis.

18. Mention some major benefits of BPR.
A. 1. Better financial performance, 2. Enhanced customer satisfaction, 3. Cost reduction, 4. Better product/service quality, 5. Increase in productivity, 6. Improved flexibility / responsiveness, 7. Reduced process times, 8. Improved employee participation, 9. Increased competitiveness, 10. Improved delivery performance.

19. Mention some major limitations of BPR.
A. Reengineering involves a great deal of risk. Some major limitations of BPR are: (i) BPR is strong medicine, often resulting in massive layoffs, (ii) It could cause disruptions in existing jobs, management systems, and organizational structures, (iii) It often involves large investments, especially in I.T., (iv) BPR cannot succeed in organizational cultures which are resistant to change, and (v) BPR is not simple or easily done, nor is it appropriate for all processes and for all organizations.

20. What is QFD?

Quality function development may be defined as a system for translating consumer requirements into appropriate requirements at every stage, from research through product design and development, to manufacture, distribution, installation and marketing, sales and service.

UNIT-V

1. What are the general requirements of quality management system? (Dec, 2011)

The organization shall establish, document, implement and maintain a quality management system and continually improve its effectiveness in accordance with the requirements of this International Standard.

The organization shall

a) determine the processes needed for the quality management system and their application throughout the organization

b) determine the sequence and interaction of these processes,

c) determine criteria and methods needed to ensure that both the operation and control of these processes are effective,

d) ensure the availability of resources and information necessary to support the operation and monitoring of these processes,

e) monitor, measure (where applicable), and analyse these processes, and

f) implement actions necessary to achieve planned results and continual improvement of these processes.

2. Draw the documentation pyramid. (Dec, 2011)

The ISO 9001 Documentation Pyramid

3. What are ISO 9000 quality standards?

ISO 9000 are a set of quality standards aimed at promoting the growth of international trade by facilitating harmonious interactions between suppliers and customers located in diverse locations globally. It is a quality management system [QMS] to ensure quality of products and services.

4. Define Quality Management Systems?

Quality management systems are the organizational structures, responsibilities, processes, procedures, and resources used for implementing quality.

5. Give any five elements of ISO 9000.

[1] Management responsibility, [2] Quality system, [3] Contract review, [4] Design control, [5] Document control, [6] Purchasing, [7] Purchaser supplied product, [8] Product identification and traceability, [9] Process control, [10] Inspection & testing

6. What are the different types of documents found in ISO 9000?

1) Quality Policy Manual *(What? Why?)*
2) Quality System Procedures *(Who? When? Where?)*
3) Work Instructions *(How?)*
4) Records, formats, forms *(Evidence)*

7. What are the eight quality principles underlying ISO 9000: 2000?

[1] Customer focus, [2] Leadership, [3] Involvement of people, [4] Process approach, [5] System approach to management, [6] Continuous improvement, [7] Decisions based on facts, and
[8] Mutually beneficial supplier relationships.

8. Define quality system audit.

Quality system audits is a systematic, independent examination to determine whether quality activities and results comply with planned arrangements, whether these arrangements are implemented effectively, and whether these are suitable to achieve objectives.

9. What are the different types of audit?

First party audit (internal), Second party audit (by customer), and Third party audit (by independent agency). *Another classification:* System audit, Process audit, Product audit, Adequacy audit, and Compliance audit.

10. What are the different stages in conducting quality audit?

1. Audit planning – schedules, personnel, notifications, checklist.
2. Performance – opening meetings, audit process, noting of non-conformities.
3. Reporting – Observations, suggestions for corrective action
4. Follow-up – implementation of corrective action.

11. What are the quality function needs served by the computer?

[1] data collection, [2] data analysis and reporting, [3] statistical analysis, [4] process control, [5] test and inspection, and [6] system design

12. What are the documentation requirements of quality management systems?

The quality management system documentation shall include

a) documented statements of a quality policy and quality objectives,
b) a quality manual
c)documented procedures and records required by this International Standard, and
d) documents, including records, determined by the organization to be necessary to ensure the effective planning, operation and control of its processes.

13. What is quality manual?

The organization shall establish and maintain a quality manual that includes
a) the scope of the quality management system, including details of and justification for any exclusions
b) the documented procedures established for the quality management system, or reference to them, and
c) a description of the interaction between the processes of the quality management system.

14. Explain the management's responsibility for ISO.
Top management shall provide evidence of its commitment to the development and implementation of the
quality management system and continually improving its effectiveness by
e) communicating to the organization the importance of meeting customer as well as statutory and regulatory
requirements,
f) establishing the quality policy,
g) ensuring that quality objectives are established,
h) conducting management reviews, and
i) ensuring the availability of resources.

15. What is the need for ISO standards?
ISO 9000 is needed to unify the quality terms and definitions used by industrialized nations and use terms to demonstrate a supplier's capability of controlling its processes.

16. What is third party audit? (Dec, 2010)
The third party certification audit is carried out much in the same way as first party and second party quality system assessments and audits. However, the big difference is that an independent accredited auditing body carries out the assessment and audit, as opposed to carrying it out by the organization themselves. Also note that the organization going for third party audits are responsible for the payment of the third party audit process.

17. Give the objectives of internal audit.
a) Determine the actual performance conforms to the documented qualitysystems.
b) Initiate corrective action activities in response to deficiencies.
c) Follow up on noncompliance items of previous audits.
d) Provide continued improvement in the system through feedback to management.

18. What is Environment Management Systems Standards?
An EMS meeting the requirements of ISO 14001:2004 is a management tool enabling an organization of any size or type to:

- identify and control the **environmental impact** of its activities, products or services, and to **improve** its environmental performance continually, and to
- implement a **systematic approach** to setting environmental objectives and targets, to achieving these and to demonstrating that they have been achieved.

19. What are the benefits of ISO 14001?
• Facilitate trade and remove trade barriers
• improve environmental performance of planet earth
• Build consensus that there is a need for environment management and a common terminology for EMS.

20. What are the requirements of ISO 14001?
i. General requirements
ii. Environmental policy
iii. Planning
iv. Implementation and operation
v. Checking and corrective action
vi. Management review

UNIT - I

1. **Explain Quality Planning?**
   - Establish quality goals
   - Identify the customers
   - Determine / discover the customer's needs
   - Develop product features which respond to the customer's needs
   - Optimize product design
   - Develop processes that are able to produce the product features
   - Establish quality controls
   - Optimize & prove process capability
   - Transfer the plans to the operating forces
2. **Explain the various Quality Costs?**
   - Preventive cost category
   - Appraisal cost category
   - Internal failure cost category
   - External failure cost category
3. **Explain the various analysis techniques for Quality Costs?**
   - Trend Analysis
   - Pareto Analysis
4. **Discuss the principles of TQM?**
   - Leadership
   - Customer satisfaction
   - Employee involvement
   - Continuous process improvement
   - Supplier partnership
   - Performance measures
5. **Describe about Quality Statements?**
   - Vision statement
   - Mission statement
   - Quality Policy statement
6. **Explain Deming Philosophy?**
   - Create and publish the aims and purposes of the organization.

- Learn the new philosophy.
- Understand the purpose of inspection.
- Stop awarding business based on price alone.
- Improve constantly and forever the system.
- Institute training.
- Teach and institute leadership.
- Drive out fear, Create trust and Create a climate for innovation.
- Optimize the efforts of teams, groups and staff areas.
- Eliminate exhortations for the work force.
- Eliminate numerical quotes for the work force.
- Eliminate management by objective.
- Remove barriers that rob people of pride of workmanship.
- Encourage education and self-improvement for everyone.
- Take action for accomplish the transformation.

7. Explain the barriers associated with TQM implementation?

- Lack of management commitment
- Inability to change organizational culture
- Improper planning
- Lack of continuous training and education
- Incompatible organizational structure and isolated individuals and departments
- Ineffective measurement techniques and lack of access to data and results.
- Paying inadequate attention to internal and external customers.
- Inadequate use of empowerment and teamwork.

8. Explain Strategic Planning?

- Goals & Objectives
- Seven Steps to Strategic Planning
- Customer needs
- Customer positioning
- Predict the future
- Gap analysis

- Closing the gap
- Alignment
- Implementation
- Annual Quality Improvement Program

9. Give the historical review of TQM?

Refer Notes

10. Explain the dimensions of quality and basic concepts of TQM?

- Dimensions of quality:
- Performance
- Features
- Conformance
- Reliability
- Durability
- Service
- Response
- Aesthetics
- Reputation

Basic concepts of TQM:

- A committed and involved management to provide long-term top-to-bottom organizational support.
- An unwavering focus on the customer, both internally and externally.
- Effective involvement and utilization of the entire work force.
- Continuous improvement of the business and production process.
- Treating suppliers as partners.
- Establish performance measures for the processes.

UNIT - II

11. Explain the information collecting tools for customer feedback?

- Comment card
- Customer Questionnaire
- Focus Groups
- Toll-Free Telephone Numbers

- Customer Visits
- Report Card
- The Internet and Computers
- Employee Feedback
- Mass Customization
- The American Customer Satisfaction Index

12. Enumerate the actions taken by the organizations to handle complaints by customers?

Refer Notes

13. Explain the elements of customer service?

- Organization
- Customer Care
- Communication
- Front-line people
- Leadership

14. Explain the various motivational theories?

- Maslow's Hierarchy of Needs
- Herzberg's Two-Factor Theory

15. Explain the concepts needed to achieve a motivated work force?

- Know thyself
- Know your employees
- Establish a positive attitude
- Share the goals
- Monitor progress
- Develop interesting work
- Communicate effectively
- Celebrate success

16. Explain the necessary three conditions to create the empowered environment?

- Everyone must understand the need for change
- The system needs to change to the new paradigm
- The organization must enable its employees

17. Explain the characteristics of successful teams?

- Sponsor
- Team charter
- Team composition
- Training
- Ground rules
- Clear objectives
- Accountability
- Well-defined decision procedures
- Resources
- Trust
- Effective problem solving
- Open communication
- Appropriate leadership
- Balanced participation
- Cohesiveness

18. Discuss the types of teams?

- Process improvement team
- Cross-functional team
- Nature work teams
- Self-directed / self-managed work teams

19. Discuss the team member roles?

- Team leader
- Facilitator
- Recorder
- Timekeeper
- Team member

20. Explain the various decision making methods?

- Nondecision
- Unilateral decision
- Handclasp decision
- Minority-rule decision

- Majority-rule decision
- Consensus

21. Explain the stages of team development?

- Forming
- Storming
- Norming
- Performing
- Adjourning

22. Discuss the common team problems and their solutions, in detail?

- Floundering
- Overbearing participants
- Dominating participants
- Reluctant participants
- Unquestioned acceptance of options as facts
- Rush to accomplish

23. Explain the common barriers to team progress?

- Insufficient training
- Incompatible rewards and compensation
- First-line supervisor resistance
- Lack of planning
- Lack of management support
- Access to information systems
- Lack of union support
- Project scope too large
- Project objectives are not significant
- No clear measures of success
- No time to do improvement work
- Team is too large
- Trapped in groupthink

24. Explain the effective reward practices and the uses of an effective recognition & reward system?

- Intrinsic rewards

- Extrinsic rewards

25. Explain the improvements suggested for performance appraisal system?

- Use rating scales that have few rating categories
- Require work team or group evaluations that are at least equal in emphasis to individual-focused evaluations
- Require more frequent performance reviews where such reviews will have a dominant emphasis on future performance planning
- Promotion decisions should be made by an independent administrative process that draws on current-job information and potential for the new job
- Include indexes of external customer satisfaction in the appraisal process
- Use peer and subordinate feedback as an index of internal customer satisfaction
- Include evaluation for process improvement in addition to results

26. Explain the Juran Trilogy?

- Planning
- Control
- Improvement

27. Explain the continuous process improvement cycle?

- Plan – Do – Study – Act

  Phases

  - Identify the opportunity
  - Analyze the process
  - Develop the optimal solution
  - Implement
  - Study the results
  - Standardize the solution
- Plan for the future

28. Explain the 5S philosophy?

- Seiko
- Seiton

- Seiketso
- Seiso
- Shitsuke

29. Explain in detail about Supplier Partnership?

Refer Notes

30. Explain the three key elements to a partnering relationship?

- Long-term commitment
- Trust
- Shared vision

31. Explain the types of sourcing?

- Sole
- Multiple
- Single

32. Give the conditions for the selection & evaluation of suppliers?

Refer Notes

33. Explain Kaizen?

Refer Notes

34. Enumerate the eight certification criteria for supplier certification?

Refer Notes

35. Explain the basic techniques for performance presentation?

- Time series graph
- Control chart
- Capability index
- Taguchi's loss function
- Cost of poor quality
- Malcolm Baldrige Quality Award

36. Explain the basic concepts and Strategy in Performance measures?

Basic Concepts

- Objectives
- Typical measurements
- Criteria

Strategy

- Quality
- Cost
- Flexibility
- Reliability
- Innovation

UNIT - III

37. Explain Six-Sigma?

- Statistical aspects
- DMAIC
- Problems

38. Explain the seven tools of quality?

- Pareto diagram
- Process flow diagram
- Cause-and-effect diagram
- Check sheets
- Histogram
- Control charts
- Scatter diagrams

39. Explain the seven new management tools?

- Affinity diagram
- Interrelationship digraph
- Tree diagram
- Matrix diagram
- Prioritization matrices
- Process decision program chart
- Activity network diagram

40. Write short notes on Process Capability?

Refer Notes

41. Explain the following:

- Measures of central tendency and dispersion
- Population & Sample
- Normal Curve

UNIT - IV

42. Explain the Benchmarking process?

- Definition
- Reasons to benchmark
- Process
- Deciding what to benchmark
- Understanding current performance
- Planning
- Studying others
- Learning from the data
- Using the findings
- Pitfalls and criticisms of benchmarking

43. Explain house of quality & discuss how to build a house of quality?

Parts of the House of Quality

Building a house of quality

- List customer requirements
- List technical descriptors
- Develop a relationship matrix between WHATs and HOWs

Develop an interrelationship matrix between HOWs

- Competitive assessments
- Develop prioritized customer requirements
- Develop prioritized technical descriptors

44. Explain QFD process & enumerate the benefits of QFD?

- QFD process

Phase I	Product planning
Phase II	Part development
Phase III	Process planning
Phase IV	Production planning

Benefits

- Improves customer satisfaction
- Reduces implementation time
- Promotes teamwork
- Provides documentation

45. Explain FMEA?

Introduction

- Reliability
- Reliability requirements
- Failure rate
- Intent of FMEA
- FMEA team
- FMEA documentation
- Types of FMEA

Stages of FMEA

- Specifying possibilities
- Quantifying risk
- Correcting high risk causes
- Re-evaluation of risk

46. Explain Taguchi Quality Loss function?

Refer Notes

47. Explain Total Productive Maintenance?

- Introduction
- The Plan
- Learning the new philosophy
- Promoting the philosophy
- Training
- Improvement Needs
- Goal
- Developing plans
- Autonomous work groups

UNIT - V

48. Explain the need for ISO 9000? Give the other quality systems? Explain ISO 9000:2000 QS?

Refer Notes

49. Explain the ISO 9001 requirements?

- Scope
- Normative reference
- Terms & definitions
- Quality Management System
- Management Responsibility
- Resource Management
- Product Realization
- Measurement, Analysis and Improvement

50. Explain the steps that are necessary to implement a quality management system?

- Senior management commitment
- Appoint the management representative
- Awareness
- Appoint an implementation team
- Training
- Time schedule
- Select element owners
- Review the present system
- Write the documents
- Install the new system
- Internal audit
- Management review
- Preassessment
- Registration

51. Explain the elements of ISO/QS 9000?

- Management responsibility
- The Quality system
- Contract review
- Design control
- Document and data control
- Purchasing
- Control of customer-supplied product
- Product identification and traceability
- Process control
- Inspection and testing
- Control of inspection, measuring and test equipment
- Inspection and test status
- Control of nonconforming product
- Corrective and preventive action
- Handling, storage, packaging, preservation and delivery
- Control of quality records
- Internal quality audits
- Training
- Servicing
- Statistical techniques

52. Explain Documentation?

- Policy
- Procedure
- Work instructions
- Records
- Document development

53. Explain Quality Auditing?

- Objectives
- Auditor
- Techniques
- Procedure

54. Explain the requirements of ISO 14001?

- General requirements
- Environmental policy
- Planning
- Implementation and operation
- Checking and corrective action
- Management review

55. Discuss the concepts & benefits of EMS?

- EMS model & concepts…
- Benefits

  Global

  Organizational