

KNOWLEDGE INSTITUTE OF TECHNOLOGY

(Accredited by NAAC, Approved by AICTE, New Delhi and Affiliated to Anna University,
Chennai)

Kakapalayam (PO), Salem – 637504.

Department of Mechanical Engineering



Beyond Knowledge

Question Bank

TOTAL QUALITY MANAGEMENT

Department of Mechanical Engineering

UNIT 1: INTRODUCTION

PART A (2Marks)

1. Define quality.

The definition of quality depends on the role of the people defining it. Most consumers have a difficult time defining quality, but they know it when they see it.

It may be defined based on

1. Customer-based Definitions
2. Manufacturing & Service-based definitions
3. Value-based definitions

2. What are the dimensions of quality?

- Performance
- Features
- Reliability
- Conformance
- Durability
- Serviceability
- Aesthetics
- Perceived quality

3. What are the dimensions of service quality?

- Time
- Timelines
- Completeness
- Courtesy
- Consistency
- Accessibility and convenience
- Accuracy
- Responsiveness

4. Define TQM.

TQM refers to an integrated approach by management to focus all functions and levels of an organization on quality and continuous improvement.

TQM focuses on encouraging continuous flow of incremental improvements from the bottom of the organization hierarchy.

5. Differentiate manufacturing and service quality?

Manufacturing quality	Service quality
Conformance to specifications	Tangible factors
Performance	Consistency
Reliability	Responsiveness to customer needs
Features	Courtesy/friendliness
Durability	Timeliness/promptness
Serviceability	Atmosphere

6. What are the basic concepts of TQM?

- Management commitment to TQM principles and methods & long term Quality plans for the Organization
- Focus on customers – internal & external
- Quality at all levels of the work force.
- Continuous improvement of the production/business process.
- Treating suppliers as partners
- Establish performance measures for the processes.

7. What are the Benefits of TQM?

- The purpose is to provide quality product to customers, which will in turn, increase productivity and lower cost.
- With higher quality products and lower price, competitive position in the market place will be enhanced.
- The series of events will allow the organizations achieve the objectives of profit and growth with greater ease.

8. What is Quality Management Framework?

Quality Management Framework or QMF is a tool to aid in the successful delivery of products and services across the enterprise.

The QMF standardizes processes, allowing for increased efficiencies (faster and less cost) in bringing new products to the market place. These processes strengthen supplier management techniques in addition to robust cost control, thereby improving our overall profit.

9. Contribution of Deming?

- Stressed management’s responsibility for quality.
- Developed “14 Points” to guide companies in quality improvement.

10. Contribution of Juran?

- Defined quality as “fitness for use.”
- Developed concept of cost of quality.

11. Contribution of Crosby?

- Coined phrase “quality is free.”
- Introduced concept of zero defects.

12. What are the barriers of TQM?

- Lack of management commitment
- Improper planning
- Lack of continuous Training and Education
- Inability to change Organizational culture
- Incompatible organizational structure and isolated individuals and department
- 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
- Failure to continually improve.

PART B (13 Marks)

1. What is quality cost? Explain the techniques used for Quality cost?
2. Explain Deming Philosophy.
3. Explain the barriers to TQM implementation.
4. Explain the concepts of Leadership.

PART C (15 Marks)

1. List the terms that affect quality in manufacturing organization and explain in detail
2. Discuss the Deming’s philosophy for TQM in detail.
3. Discuss the Juran’s principles of quality improvement.

UNIT II : TQM PRINCIPLES

PART A (2Marks)

1. What a leader must understand to become successful?
 - People, paradoxically, need security and independence at the same time.
 - People are sensitive to external rewards and punishments and yet are also strongly self-motivated.
 - People like to hear a kind of praise.

- People can process only a few at a time; thus, a leader needs to keep things simple.
 - People trust their gut reaction more than statistical data.
2. What are the seven steps of strategic planning?
 - Customer needs
 - Customer positioning
 - Predict the future
 - Gap analysis
 - Closing the gap
 - Alignment
 - Implementation
 3. Define external and internal customer?
 - An external customer exists outside organizations and buys the organization's products and/or services.
 - An internal customer exists within the organizations. When the raw material is processed in the organization, it is processed in different sections as per the route chart.
 4. What do you mean by customer satisfaction?

Customer satisfaction involves the customer's experience with the product. Customer satisfaction is a qualitative performance as defined by customers, which meet their basic requirements. It is based upon person's emotional state.
 5. What are customer complaints?

Customer complaints are very important feedback about quality of the product or service. They should not be ignored. Both positive and negative feedback have to be recorded and analyzed periodically. Customer complaints form the basis for many innovative products and designs.
 6. What are the aspects of customer retention?

A major concern for service organization is retaining the customers. Customers always demand more from the company. Unless organizations improve their quality and peg down the cost and provide value addition to the customers, they may lose the customers to their competitors providing a better service.

7. What do you mean by employee involvement?

Employee involvement refers to any activity by which employees participate in work related decision and improvement activities, with the objectives of tapping the creative energies of all employees and improving their motivation.

It includes

- Making suggestions
- Setting goals
- Decision making
- Solving problems

8. Define team.

A team is a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and an approach for which they hold themselves mutually accountable.

9. What is empowerment?

Empowerment simply means giving people authority to make decision based on what they feel is right, have control over their work, take risks and learn from mistakes, and promote change. Empowerment requires a sincere belief and trust in people.

10. What is recognition?

Recognition provides a visible means of promoting quality efforts and telling employees that the organization values their efforts, which stimulate their motivation to improve. Recognition refers to all aspects of pay and reward, including promotions, bonuses and recognition either monetary or individual and group.

11. What is motivation?

Motivation can be defined as the art of creating conditions that allow everyone of us to get his work done at his own peak level of efficiency. A more formal definition of motivation is an individual's. Motivations are relates to high satisfaction and willingness to work harder to achieve more.

12. List down the characteristics of motivation?

- Responsibility
- Achievement
- Advantage
- The work itself (a challenge)
- Recognition
- The possibility of growth

13. What is reward?

Reward is something tangible such as theater tickets, dinner for cash award to promote desirable behavior. Recognition and reward go together to form a system for letting people know they are valuable members of the organization.

14. Define performance appraisal?

Performance appraisal is a process for evaluating and generating information about employee's effectiveness and efficiency at work.

15. What are the benefits of performance appraisal?

- It helps the management assess the potential of a person.
- It helps in developing future managers to take up higher responsibilities.
- It helps in determining a performance linked reward or compensation package.
- It helps to assess the weakness of the individual and hence determine the training needs.

16. What is meant by continuous process improvement?

Continuous process improvement is the hall mark of TQM adopted organizations. Improvements have to be done on a continuous basis. Efforts to make continuous improvement have to be implemented by reducing wastage, improving efficiency, eliminating rejection and rework, using six sigma concepts, and so on.

17. What is PDCA cycle?

Deming maintains that the PDCA (Plan, Do, Check, Act) cycle is a universal improvement methodology. The idea is constantly to improve the difference in the requirements of customers and performance of the process. The cycle begin by planning what to do (design of the product and its features).

18. What are called 5S?

- **Seiri**, sort, clean up
- **Seiton**, straighten (or simplify), configure, organization
- **Seiso**, scrub (or sweep), clean and check regularly
- **Seiketsu**, standardize, conformity
- **Shitsuke**, self discipline, custom and practice, training and routine

19. What is supplier partnership?

Partnership is a long term commitment between two or more organization for the purpose of achieving specific business goals and objectives by maximizing the effectiveness of each participant's resources. The relationship is based upon trust, dedication to common goals and objectives, and understanding of each other's expectations and values.

Benefits includes

- Improved quality
- Increased efficiency
- Lower cost
- Increased opportunity for innovation, and so on.

20. What is a supplier selection criterion?

It is the process of selecting supplier and service providers who share the companies' dedication to excellence. Companies seek to establish relationship with organizations that share their ideas on business conduct. Some of the selection criteria include:

- Leadership within the industry
- High quality, action-oriented management
- Outstanding quality management
- Commitment to superior customer service and customer satisfaction

21. What is supplier rating system (SRS)?

The supplier rating system is a critical component of overall supplier relationship management strategy. Supplier performance data collected in SRS consist of quantitative information. All suppliers are rated according to quality and delivery data. Core and critical suppliers will be rated based on both quantitative and qualitative information when data becomes available. Qualitative measures include cost management, technology, general management and responsiveness.

PART B (13 Marks)

1. Explain Juran trilogy for Continuous Process Improvement?
2. Explain the PDSA cycle.
3. Explain Kaizen principle.
4. Explain how the employee will be involved in doing a process.
5. Brief on Employee Empowerment.

PART C (15 Marks)

1. Explain the different approaches towards continuous process improvement
2. Write short notes on a. Leadership b. Quality statements
3. Describe in detail about 5s Kaizen concepts with example.

UNIT III: TQM TOOLS & TECHNIQUES I**PART A (2 Marks)**

1. List out the seven traditional tools of quality?

- Pareto analysis
- Process flow diagram
- Cause and effect diagram
- Histogram
- Check sheet
- Scatter diagram
- Control charts

2. List out the seven new tools of quality?

- Affinity diagram
- Relations diagram
- Tree diagram
- Matrix diagram
- Arrow diagram
- Matrix data analysis
- Process decision program chart

3. Concept of six sigma?

Six sigma means data driven decision making.

Six sigma is a highly disciplined approach to decision making that helps people focus on improving processes to make them as perfect as possible.

Six sigma practitioners focus on systematically eliminating the defects so they can get as close to “zero defects” as possible.

Six sigma ensures that internal processes are running at optimum efficiency.

4. Why do companies implement six sigma?

Some of benefits companies see after executing six sigma are,

- Increased earnings and profitability
- Improved customer satisfaction
- Better educated and productive workforce
- Improved employee problem solving skills
- Reduced capital spending
- Increased capacity

5. What are the objectives for benchmarking?
 - Benchmarking aims at a goal setting process to facilitate comparison with the best.
 - It aims at motivating and stimulating company towards the goal of continuous quality improvement.
 - It aims at external orientation of the company.
 - It aims at identifying a technological breakthrough
 - It aims at searching for industry best practices.

6. What is FMEA?

Failure Mode and Effect Analysis is also known as risk analysis, is preventive measure to systematically display the causes, effects and possible actions regarding observed failures.

7. List the four stages of FMEA?
 - Specifying possibilities
 - Quantifying risk
 - Correcting high risk causes
 - Re-evaluation of risk

8. What are the various types of FMEA?
 - System FMEA
 - Process FMEA
 - Design FMEA
 - Service FMEA
 - Equipment FMEA
 - Maintenance FMEA
 - Concept FMEA
 - Environmental FMEA

9. List out the benefits of FMEA.
 - Improved product / process reliability and quality
 - Increased customer satisfaction
 - Early identification and elimination of potential / process failure modes
 - Prioritized product / process deficiencies

10. Differentiate the term Failure Mode and Failure Effects?

A **failure mode** is defined as the manner in which a component, subsystem, system process, etc., could potentially fail to meet the design purpose.

A *failure effect* is defined as the result of a failure mode on the function of the product / process as perceived.

PART B (13 Marks)

1. Explain the QC or SPC tools.
2. Explain the Seven Management Tools.
3. Plot the control chart for variables and attributes.
4. Explain the concepts of Six Sigma with an example.

PART C (15 Marks)

1. Discuss the various stages of FMEA with an illustration.
2. Describe the seven traditional tools of TQM.
3. What is Benchmarking and why do the organizations adopt this technique?
4. Perform an FMEA to anticipate various problem faced and method to eliminate the process of “getting up from bed in the morning and going to school”.

UNIT IV: TQM TOOLS & TECHNIQUES II

PART A (2Marks)

1. What is QFD?

Quality function deployment (QFD) 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.

2. What are the objectives of QFD?

The objectives of QFD are:

1. To identify the true voice of the customer and to use this knowledge to develop products which satisfy customers.
2. To help in the organization and analysis of all the pertinent information associated with the project.

3. What are the four phases of product development in QFD process?

- i. Product planning
- ii. Part development
- iii. Process planning
- iv. Production planning

4. List out any four benefits of QFD?

QFD is a communication and planning tool that:

1. Promote better understanding of customer demands.
2. Improves customer satisfaction
3. Promotes team work
4. Facilitate better understanding of design interactions.

5. What are Taguchi methods?

Taguchi methods are statistical methods developed to improve the quality of manufactured goods.

Taguchi's principle contributions to statistics are:

1. Taguchi loss function
2. The philosophy of off-line quality control
3. Innovations in the design of experiments.

6. Define quality in terms of Taguchi's words.

Taguchi defines quality as "The loss imparted by the product to society from the time the product is shipped.

7. Write down the philosophy of quality loss function.

The loss function philosophy says that for a manufacture, the best strategy is to produce products as close to the target as possible, rather than aiming at "being within specifications", largely by Genichi Taguchi.

8. State the concept of quality loss function.

The essence of the quality loss function (QLF) concept is that whatever a product deviates from its target performance, it generates a loss to society. This loss is minimal when performance is right on target, but it grows gradually as one deviates from the target.

9. Define maintenance.

Maintenance is defined as the management, control, execution and quality assurance of activities which ensure the achievement of optimum availability and performance of a plant in order to meet business objectives.

10. What are the types of maintenance?

The four types of maintenance are:

1. Corrective or break down maintenance

2. Scheduled or Routine maintenance
3. Preventive maintenance
4. Predictive maintenance

11. What do you mean by preventive maintenance?

Preventive maintenance is carried out before the failure arises or prior to the equipment actually breaks down. It is safety measure designed to minimize the possibility of unanticipated breakdowns and interruptions in production.

12. What do you mean by the term predictive maintenance?

In predictive technique, on the prediction of any fault, maintenance is being done. In this technique, equipments condition is measured periodically or on a continuous basis. This enables maintenance staff to take a timely action such as equipment adjustments repair and overhaul.

13. What is TPM?

TPM is the systematic execution of maintenance by all employees through small group activities. The dual goals of TPM are zero breakdowns and zero defects.

14. What are the objectives of TPM?

The objective sof TPM are:

1. To improve equipment effectiveness
2. To achieve autonomous maintenance
3. To plan maintenance
4. To train all staff in relevant maintenance skills
5. To achieve early equipment management.

15. What is concept of 'true' TPM?

The concept of true TPM is that everyone from the operator to top management is responsible for maintenance activities.

PART B (13 Marks)

1. Explain the Bench marking Process and reasons to Benchmark.
2. Explain the QFD process.
3. Explain the House of Quality in Quality Function Deployment.
4. What is FMEA? Explain the stages of FMEA?

PART C (15 Marks)

1. Explain the seven step plan to establish the TPM in an organization in detail
2. Explain the different types of cost contributing to the cost of quality.
3. Write a note on performance measures of TQM.
4. Explain the seven steps plan to establish the TPM in an organization in detail.

UNIT V QUALITY SYSTEMS**PART A (2 Marks)**

1. What do you mean by the term quality systems?
The quality system is the organizational structure, responsibilities, procedures, processes and resources for implementing quality management.
2. What is ISO?
ISO (International Organization for Standardization) is a specialized agency for standardization. The primary objective of ISO is coordination and unification of Indian standards.
3. What is ISO 9000 and ISO 14000?
ISO 9000 has become an international reference for quality management requirements in business-to-business dealings.
ISO 14000 is for environmental management.
4. What is the function of ISO 9000 family?
The ISO 9000 family is primarily concerned with “quality management”. This means what the organization does to fulfill:
 - The customer’s quality requirements and
 - Applicable regulatory requirements, while aiming to enhance customer satisfaction, and
 - Achieve continual improvement of its performance in pursuit of these objectives.
 -
5. What is the function of ISO 14000 family?
The ISO 14000 family is primarily concerned with “environmental management”. This means what the organization does to:
 - Minimize harmful effects on the environment caused by its activities and to
 - Achieve continual improvement of its environmental performance.

6. What are reasons for implementing a quality system that conforms to an ISO standards? User's experience clearly indicates the several significant improvements in the following areas:

- Improved employee involvement
- Improved housekeeping
- Improved decision making based on facts and data
- Improved customer satisfaction
- Improved safe working
- Reduced customer complaints
- Reduced inspection efforts
- Reduced quality cost

7. What are the ISO 9000 standards?

The ISO 9000 standards are a collection of formal international standards, technical reports, handbooks and web based documents on quality management and quality assurance.

8. What is responsible for developing ISO 9000 standards?

ISO technical committee and its sub-committees are responsible for the development of the standards. The work is conducted on the basis of "consumers" among quality and industry experts nominated by the national standards bodies, representing a wide range of interested parties.

9. Where we can apply the ISO 9000 series of standards?

ISO 9000 series of standards are applied to any organization, large or small, whether its product, and whether it is a business enterprises, a public administration or a government department.

10. Write down the necessity for documentation.

1. The proper documentation is the pre-requisite for implementing quality system.

2. The documentation serves as a reference for the management, the staff and other agencies whose involvement is essential for implementation of the quality system.

11. Define quality auditing.

A quality system audit is defined as “a systematic and independent examination to determine whether quality activities and related results comply with planned arrangement, whether these arrangements are implemented effectively and whether these are suitable to achieve objectives”.

12. What are the types of audit?

1. First party audit (or Internal audit)
2. Second party audit
3. Third party audit

13. What are the objectives of quality audits?

1. To determine the conformity or non-conformity of the quality system elements with regard to specified requirements.
2. To determine the effectiveness of the implemented quality system in meeting specified quality objectives.
3. To meet regulatory requirements, if applicable.
4. To permit the listing of the audited organizations quality system in a register for third party certification.
5. To evaluate an organization's own quality system against a quality system standard.

14. List the stages of an audit

1. Audit planning
2. Audit performance
3. Audit reporting
4. Audit follow-up

15. What is QS 9000?

QS 9000 is a set of quality system requirements to help automotive suppliers to ensure that they are meeting / exceeding customer requirements.

16. What are the objectives of QS 9000?

The objectives of QS 9000 is to develop fundamental quality system based on continuous improvement, defect prevention, reduction of variation and waste elimination in the automobile supply chain.

17. What are the documents required for QS 9000 programme?

The minimum seven documents required are:

1. QS 9000 quality system requirements
2. Advanced System Quality Planning (APQP)
3. FMEA
4. Measurement System Analysis
5. Fundamental SPC
6. Production Part Approval Process (PPAP) manual
7. Quality System Assessment (QSA) manual

18. Match the following:

- | | |
|--------------|---|
| 1. ISO 9001 | (a) model for quality assurance in final inspection and test |
| 2. ISO 9002 | (b) models for auditing quality systems |
| 3. ISO 9003 | (c) models for quality assurance in design, development, production, installation and servicing |
| 4. ISO 9004 | (d) automotive quality management system |
| 5. ISO 10011 | (e) model for quality assurance in production and installation |
| 6. QS 9000 | (f) quality management and quality system element |

Ans: 1. (c); 2. (e); 3. (a); 4. (f); 5. (b); 6. (d)

19. The series of ISO 14000 standards are designed to cover:

1. Environment management system

2. Environmental auditing
3. Environmental performance evaluation
4. Life cycle assessment
5. Environmental aspects in product standards

20. In what way, the concept of ISO 14000 differs from ISO 9000 series of quality system?

The ISO 14000 family is concerned with environmental management, whereas the ISO 9000 family is concerned with quality management.

PART B (13 Marks)

1. Explain the elements of ISO 9000:2000.
2. Explain the implementation and documentation of Quality System.
3. Explain the requirements of ISO 14000.
4. Explain the Benefits of ISO 14000.
5. Discuss about ISO 9000:2000 Quality Systems.
6. Why is ISO 9000 important? Explain briefly.

PART C (15 Marks)

1. Discuss the implementation of TQM with a case study from the manufacturing industry.
2. Discuss the need for standardization procedures for quality assurance. Explain the requirements of ISO system of documentation