



St. Joseph College of Engineering
Sriperumbudur, Chennai - 602117
EVEN SEMESTER (2017 - 2018)

Name of the Department: Information Technology
Year /Semester : III /06

Name of the Faculty: Ms.R.SARALA

Lesson Plan & Schedule (**GE6757 - TOTAL QUALITY MANAGEMENT**)

Unit	Task	No of Hours Required	Actual hours Taken, Reason for the deviation	Teaching Method BB/PP/ Video	Book	Dependencies (page no.)	Remarks	No of Students Present
UNIT I(9 hours) INTRODUC-TION	Introduction - Need for quality	1		BB	T1	6		
	Evolution of quality	1		BB	T1	7		
	Definition of quality	1		BB	T1	20		
	Dimensions of manufacturing and service quality	1		BB	T1	27		
	Basic concepts of TQM	1		BB	T1	30		
	Definition of TQM	1		BB	T1	32		
	TQM Framework	1		BB	T1	38	Assignment-I	
	Contributions of Deming, Juran and Crosby	1		BB	T1	50		
	Barriers to TQM	1		BB	T1	58		
	Tutorial (Test)	1	Basic concepts of TQM					



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UNIT II (9 hours) TQM PRINCIPLES	Leadership – Strategic quality planning	1		BB	T1	66		
	Quality statements - Customer focus	1		BB	T1	112		
	Customer orientation, Customer satisfaction, Customer complaints, Customer retention	1		BB	T1	120		
	Employee involvement Motivation, Empowerment, Team and Teamwork	2		BB	T1	139	Assignment -II	
	Recognition and Reward,	1		BB	T1	180		
	Performance appraisal Continuous process improvement	1		BB	T1	190		
	PDSA cycle, 5s, Kaizen - Supplier partnership	1		BB	T1	198		
	Partnering, Supplier selection, Supplier Rating.	1		BB	T1	200		
Tutorial (Test)	1	PDSA cycle, 5s, Kaizen -Supplier partnership						



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UNIT III (9 Hours) TQM TOOLS & TECHNIQUES I	The seven traditional tools of quality	1		BB	T1	271			
	New management tools	1		BB	T1	274			
	Six-sigma: Concepts, methodology	1		BB	T1	284			
	applications to manufacturing	1		BB	T1	291			
	service sector including IT	1		BB	T1	295			
	Bench marking – Reason to bench mark	1		BB	T1	318	Assignment-III		
	Bench marking process	1		BB	T1	320			
	FMEA – Stages, Types.	1		BB	T1	336			
	Tutorial (Test)	1	Bench marking – Reason to bench mark						



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Unit IV (9 Hours) TQM TOOLS & TECHNIQUES II	Quality circles	1		BB	T1	378		
	Quality Function Deployment (QFD)	1		BB	T1	380		
	Quality Function Deployment (QFD)	1		BB	T1	382		
	Taguchi quality loss function	1		BB	T1	386		
	Taguchi quality loss function	1		BB	T1	390		
	TPM – Concepts	1		BB	T1	392	Assignment-IV	
	improvement needs	1		BB	T1	394		
	Cost of Quality	1		BB	T1	398		
	Performance measures	1		BB	T1	406		
	Tutorial (Test)	1	Taguchi quality loss function					



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Unit V (9 Hours) QUALITY SYSTEMS	Need for ISO 9000	1		BB	T1	411		
	QS 9000	1		BB	T1	413		
	2000 Quality System	1		BB	T1	418		
	Elements	1		BB	T1	420		
	Documentation, Quality auditing	1		BB	T1	426		
	Documentation, Quality auditing	1		BB	T1	430		
	ISO 14000 – Concepts	1		BB	T1	433		
	Requirements and Benefits	1		BB	T1	439	Assignment-V	
	Case studies of TQM implementation in manufacturing and service sectors including IT.	1		BB	T1	440		
	Tutorial (Test)	1	ISO 14000 – Concepts					



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(Note: **BB= Black Board, PP=Power Point Presentation, VIDEO = Video Lecture**)

TEXT BOOK:

1. Dale H.Besterfiled, et at., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint (2006)

REFERENCES:

1. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, 6th Edition, South-Western (Thomson Learning), 2005.
2. Oakland, J.S. “TQM – Text with Cases”, Butterworth – Heinemann Ltd., Oxford, 3rd Edition, 2003.
3. Suganthi,L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Pvt. Ltd.,2006.
4. Janakiraman,B and Gopal, R.K, “Total Quality Management – Text and Cases”, Prentice Hall (India) Pvt. Ltd., 2006.

Signature of the Staff

Signature of the HOD

Signature of the Principal

UNIT I
INTRODUCTION

SYLLABUS: Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, and Customer retention - Costs of quality.

PART-A

1. Define quality. (May 2010) (APRIL 2014) (May/June2014) (Apr/May 2015)

Quality = Performance x Expectations

- (i) Quality is defined as the predictable degree of uniformity and dependability, at low cost Suited to the market. (Deming).
- (ii) Quality is defined as fitness for use (Juan).
- (iii) Quality is defined as conformance to requirements (Crosby).
- (iv) Quality is totality of the characteristics of entity that bear on its ability to satisfy stated And implied needs (ISO).

2. What are the dimensions of quality?

Performance—such as acceleration of a vehicle;
Reliability—that the product will function as expected without failure;
Features—the extras that are included beyond the basic characteristics;
Durability—expected operational life of the product; and
Serviceability—how readily a product can be repaired.

3. Define Total Quality? (DEC 2010)

TQM is an enhancement to the traditional way of doing business. It is the art of managing the whole to achieve excellence. It is defined both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. It is the application of quantitative methods and human resources to improve all the processes within an organization and exceed customer needs now and in the future. It integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach.

4. Give the Basic Concepts of TQM? (DEC 2011)

- 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.

5. List the dimensions of quality./What are the element of TQM? (MAY 2010) (MAY/JUNE 2013)

The dimensions of quality are

1. Performance
2. Futures
3. Conformance
4. Reliability
5. Durability
6. Service
7. Response
8. Aesthetics and
9. Repetition.

6. What are the three components of the Juran Trilogy? (JUNE 2012)

The three components of the Juran Trilogy are

- i. Planning
- ii. Control
- iii. Improvement

7. What are the six basic concepts that a successful TQM programme requires?(DEC 2012) (APRIL/MAY 2012)

The six basic concepts that a successful TQM programme requires

1. Top management commitment
2. Focus on the customer
3. Effective employee involvement
4. Continuous improvement
5. Treating suppliers as partners and
6. Establishing performance measures.

8. What are the pillars of TQM?

The four pillars of TQM are:

1. Problem solving discipline
2. Interpersonal skills
3. Teamwork and
4. Quality improvement process

9. Give the Objectives of TQM? (DEC 2011)

- a. To develop a conceptual understanding of the basic principles and methods associated with TQM
- b. To develop an understanding of how these principles and methods have been put into effect in a variety of organizations;
- c. To develop an understanding of the relationship between TQM principles and the theories and models studied in traditional management
- d. To do the right things, right the first time, every time.

10. Give the Quality Hierarchy?

1. Inspection
2. Quality Control (QC)
3. Quality Assurance (QA)
4. Total Quality Management

11. Tabulate the tangible and intangible benefits of TQM. (NOV/DEC 2011) (MAY 2012)

- Improved product quality
- Improved productivity
- Reduced quality costs
- Increased market

12. What does a typical meeting agenda contain after establishing the TQM?

- Progress report on teams
- Customer satisfaction report
- Progress on meeting goals
- New project teams
- Recognition dinner
- Benchmarking report

13. Define the concept of Deming philosophy

Create and communicate to all employees a statement of the aims and purposes of the company. Adapt to the new philosophy of the day; industries and economics are always changing.

14. What is meant by service quality (MAY/JUNE 2013)

Service quality is a comparison of expectations with performance. A business with high service quality will meet customer needs whilst remaining economically competitive. Improved service quality may increase economic competitiveness.

15. Why Quality is required in products and services today (MAY/JUNE 2014)

Management leadership and long term commitment

1. A management culture of partnership, learning together, guidance and support for employees
2. Clearly defined business objectives communicated by managers and supervisors, understood and “owned” by all employees. “Ownership” can be viewed as the “acceptance of accountability”.
3. Encouraging and empowering all employees to adopt “ownership” behavior. Ownership of their outputs, ownership of customer’s problems, ownership of improvement actions.

16. What are the dimensions of service Quality (NOV/DEC 2013)

The dimensions of quality are

1. Performance
2. Futures
3. Conformance
4. Reliability
5. Durability
6. Service
7. Response
8. Aesthetics and
9. Repetition.

17. What is the concept of TQM (NOV/DEC 2013) (Apr/May 2015)

A comprehensive, organization-wide effort to improve the quality of products and services, applicable to all organizations.

18. What are barriers to implement to TQM? (Apr/May 2015)

To fully understand the TQM movement, we need to look at the philosophies of notable individuals who have shaped the evolution of TQM. Their philosophies and teachings have contributed to our knowledge and understanding of quality today.

- ❖ One idea may be to look at new industry philosophies around continuous improvement. The adoption of 'way of working' philosophies and 'lean' philosophies and how they tie in with TQM.
- ❖ Buzzwords such as 'empowerment', 'training' and 'knowledge-sharing' may be useful in researching seminars on such topics.
- ❖ Look at how attitudes of employees are improved with 'growth involvement' An interesting was the 'Fish Philosophy'.

19. Who are internal and external customers?

The customers inside the company are called internal customers, whereas the customers outside the company are called external customers.

20. What are the customer's perceptions on quality? (DEC 2011)

The six important customer's perceptions are:

- (i) Performance
- (ii) Features
- (iii) Service
- (iv) Warranty
- (v) Price and
- (vi) Reputation.

21. List the various tools used for collecting customer complaints.

The various tools used are: 1.

- Comment card.
- 2. Customer questionnaire
- 3. Focus groups
- 4. Toll-free telephone numbers
- 5. Report cards
- 6. The Internet and computer etc.

22. What is meant by customer retention? (May 2010)

Customer retention is the process of retaining the existing customers.

23. What are the different ways to create customer oriented culture in an industry? (NOV/DEC 2016)

- 1. Start at the top
- 2. Hire people who fit
- 3. Get everyone involved
- 4. Trust your team
- 5. Establish good lines of communication

PART-B

- 1 i. Explain about quality council and quality planning **(R)**
 - ii. Explain about Deming's philosophy **(APRIL/MAY 2008) (R)**
- 2 i. Explain the contribution of Juran to the quality movement. **(U)**
 - ii. Discuss about the implementation steps of TQM and mention the importance of the Management commitment. **(APRIL/MAY 2008) (U)**
3. Write the different definitions given for quality? Explain how it got evolved and what are its prime concerns. **(APRIL/MAY 2009) (R)**
- 4.i Discuss the management techniques for establishing quality costs. **(U)**
 - ii Describe the various Quality Statements. Give examples. **(APRIL/MAY 2009) (R)**
- 5 i Describe the six basic concepts of TQM. **(R)**
 - ii Understand the various dimensions of quality. **(U) (NOV/DEC 2011) (APRIL/MAY 2016)**
- 6 i Discuss the Deming's philosophy for TQM. **(R)**
 - ii Explain the barriers to TQM implementation and solution. **(NOV/DEC 2011) (R)**
7. Elaborate Juran's principles of quality improvement. **(APRIL/MAY 2012) (U)**
8. Explain Deming's fourteen point philosophy for quality improvement. **(U) (MAY 2012)**
9. i Elaborate the Deming's philosophy over the quality and productivity improvement. **(APR/MAY 2015) (U)**
 - ii Describe the barriers in the implementation of TQM. **(NOV/DEC 2012) (R)**
10. Consider any one service organization of your choice and explain the various dimensions of quality of service. **(NOV/DEC 2012) (U)**
- 11.i.Explain the characteristics of TQM derived from its definitions. **(MAY/JUNE 2013)(R)**
 - ii.Explain the Juran's views of TQM. **(MAY/JUNE 2013)& (MAY/JUNE 2014) (R)**
12. i. Explain "Various difficulties can be anticipated in the implementation of TQM programme"
Validate the statement. **(MAY/JUNE 2013) (R)**
 - ii.Discuss in detail the dimensions of Quality in the context of 'Service' **(MAY/JUNE 2013) (U)**

UNIT-2**TQM PRINCIPLES**

SYLLABUS: Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

PART-A**1. What is motivation?**

Motivation means a process of stimulation people to accomplish desired goals.

2. What are the Maslow's basic needs? (DEC 2011)

Maslow's basic needs are:

1. Physiological
2. Safety
3. Society
4. Esteem and
5. Self-actualization needs.

3. What are physiological needs?

Physiological needs are the biological needs required to preserve human life. These needs include needs for food, clothing and shelter

4. List the Herzberg's motivators and dissatisfies.

- Motivator factors Dissatisfier or hygiene factors
- Achievement
- Recognition
- The work itself
- Responsibility
- Advancement and growth.
- Supervisors
- Working conditions
- Interpersonal relationships
- Pay and security
- Company policy and
- Administration

5. Define empowerment. (Nov /Dec 2011)

Empowerment is an environment in which people have the ability, the confidence, and the commitment to take the responsibility and ownership to improve the process and initiate the necessary steps to satisfy customers' requirements within well-defined boundaries in order to achieve organizational values and goals.

6. What are the conditions necessary for empowerment?

The conditions required are:

1. Everyone must understand the need for change.
2. The system needs to change to the new paradigm.
3. The organization must provide information, education and still to its employees.

7. Define team and teamwork. (May 2010)

A team can be defined as a group of people working together to achieve common objectives or goals. Teamwork is the cumulative actions of the team during which each member of the team subordinates his individual interests and opinions to fulfill the objectives or goals of the group.

8. List the different types of teams.

The different types of teams are

1. Process improvement team
2. Cross-functional team
3. Natural work team and
4. Self-directed work team.

9. Name different members in a team.

The different members in a team are

1. Team leader
2. Facilitator
3. Recorder
4. Timekeeper and 5. Member

10. What is needed for a leader to be effective? (MAY 2013)

To be effective, a leader needs to know and understand the following:

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 word of praise. People can process only a few facts at a time; thus, a leader needs to keep things simple. -People trust their gut reaction more than statistical data. People distrust a leader's rhetoric if the words are inconsistent with the leader's actions.

11. What is the important role of senior management?

Listening to internal and external customers and suppliers through visits, focus groups and surveys. Communication. To drive fear out of the organization, break down barriers, remove system roadblocks, anticipate and minimize resistance to change and in general, change the culture.

12. Give the basic steps to strategic quality planning? (DEC 2011)

- i. Customer needs
- ii. Customer positioning
- iii. Predict the future
- iv. Gap analysis
- v. Closing the gap
- vi. Alignment
- vii. Implementation

13. What is meant by recognition in an organization?

Recognition is a process whereby management shows acknowledgement of an employee's outstanding performance.

14. Classify rewards.

1. **Intrinsic rewards:** These are related to feelings of accomplishment or selfworth.
2. **Extrinsic rewards:** These are related to pay or compensation issues.

15. What is performance appraisal? (June 06)

Performance appraisal is a systematic and objective assessment or evaluation of performance and contribution of an individual.

16. List four common barriers to team progress.

The four common barriers to team progress

1. Insufficient training
2. Incompatible rewards and compensation
3. Lack of management support

17. Give the steps involved in training process?

The steps involved in training process are

1. Make everyone aware of what the training is all about.
2. Get acceptance.
3. Adapt the program.
4. Adapt to what has been agreed upon.

18. Define Recognition and Reward?

Recognition is a form of employee motivation in which the organization publicly acknowledges the positive contributions an individual or team has made to the success of the organization.

Reward is something tangible to promote desirable behavior. Recognition and reward go together to form a system for letting people know they are valuable Members of the organization.

19. What are the types of appraisal formats?

The types of appraisal formats are

- i. Ranking
- ii. Narrative
- iii. Graphic
- iv. Forced choice

20. What are the basic ways for a continuous process improvement?

The basic ways for a continuous process improvement are

1. Reduce resources
2. Reduce errors
3. Meet or exceed expectations of downstream customers
4. Make the process safer
5. Make the process more satisfying to the person doing it.

21. What are the three components of the Juran Trilogy? (May 2011)

The three components of the Juran Trilogy are

- i. Planning
- ii. Control
- iii. Improvement

22. What are the steps in the PDSA cycle?

The steps in the PDSA cycle are

The basic Plan-Do-Study-Act is an effective improvement technique.

1. Plan carefully what is to be done
2. Carry out the plan
3. Study the results
4. Act on the results by identifying what worked as planned and what didn't.

23. What are the phases of a Continuous Process Improvement Cycle?

The phases of a Continuous Process Improvement Cycle are

- a) Identify the opportunity
- b) Analyze the process
- c) Develop the optimal solutions

- d) Implement
- e) Study the results
- f) Standardize the solution
- g) Plan for the future

24. What are the objectives of Performance measures?

The objectives of Performance measures are

- i. Establish baseline measures and reveal trends.
- ii. Determine which processes need to be improved.
- iii. Indicate process gains and losses.
- iv. Compare goals with actual performance.
- v. Provide information for individual and team evaluation.
- vi. Provide information to make informed decisions.
- vii. Determine the overall performance of the organization.

25. What are the characteristics used to measure the performance of a particular process?

The characteristics used to measure the performance of a particular Process are

- viii. Quantity
- ix. Cost
- x. Time
- xi. Accuracy
- xii. Function
- xiii. Service
- xiv. Aesthetics

PART-B

1. Explain the following
 - (i) Juran Trilogy (ii) PDSA cycle **(R)**
 - iii. Maslow's theory of need hierarchy. **(APRIL/MAY 2008)(R)**
2. Discuss about the supplier partnership procedures. **(APRIL/MAY 2008) (R)**
- 3 (i) Explain the key elements of partnering. **(R)**
 - (ii) Explain the conditions for selection and evaluation of suppliers. **(APRIL/MAY 2009) (R)**
4. (i) Write about the system of recognition and reward followed in an organization. **(R)**
 - (ii) What are the suggestions to improve the appraisal system? **(NOV/DEC 2011) (R)**
5. Understand the different approaches towards Continuous Process Improvement **(NOV/DEC 2011) (U)**
6. i Discuss how quality council is structured in
 1. University Academic Department **(U)**
 2. Manufacturing facility **(U)**ii Distinguish between internal and external customers. **(APRIL/MAY 2012) (U)**
7. i Explain the PDCA improvement cycle in detail. **(R)**
 - ii Brief on employee empowerment. **(NOV/DEC 2012) (R)**
8. What is a team? Explain the functions and characteristics of a successful team. **(NOV/DEC 2012) (R)**
9. i. What is meant by strategic planning? Narrate the seven steps procedure of strategic planning cycle. **(MAY/JUNE 2013) (R)**
 - ii. Explain the characteristics of successful team? **(MAY/JUNE 2013) (R)**
10. Explain the phases of PDSA cycle with suitable illustration. **(MAY/JUNE 2013) (R)**
11. What are the 7 habits of highly effective people? Discuss in details **(JUNE 2014) (U)**
12. (i)What are the characteristics of successful team .Discuss in detail **(R)**
 - (ii)How is Kaizen practiced in workplace? Give an example? **(MAY/JUNE 2014) (U)**

UNIT III**TQM TOOLS & TECHNIQUES I**

SYLLABUS: The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

PART-A**1. Give the seven tools of quality? (MAY 2013) (Apr/May 2015)**

- i. Pareto Diagram
- ii. Process Flow Diagram
- iii. Cause-and-Effect Diagram
- iv. Check Sheets
- v. Histogram
- vi. Control Charts
- vii. Scatter Diagrams

2. Define Statistics?

Statistics is defined as the science that deals with the collection, tabulation, analysis, interpretation, and presentation of quantitative data.

3. What is a measure of central tendency? (May 2010)

A measure of central tendency of a distribution is a numerical value that describes the central position of the data or how the data tend to build up in the center. There are three measures in common in use in quality viz, the average, the median and the mode.

4. What is Measures of dispersion?

Measures of dispersion describe how the data are spread out or scattered on each side of the central value. The measures of dispersion used are range and standard deviation.

5. What is a normal curve?

The normal curve is a symmetrical, unimodal, bell-shaped distribution with the mean, median and mode having the same value.

6. What is the use of the control chart?

The control chart is used to keep a continuing record of a particular quality characteristic. It is a picture of process over time.

7. Give the objectives of the attribute charts?

- i. Determine the average quality level.
- ii. Bring to the attention of management any changes in the average.
- iii. Improve the product quality.
- iv. Evaluate the quality performance of operating and management personnel.
- v. Determine acceptance criteria of a product before shipment to the customer.

8. Define Six Sigma Method? (May 2011) (NOV/DEC 2016)

Define - improvement opportunity with an emphasis on increasing customer satisfaction.

Measure - determine process capability (Cp/ Cpk) & dpmo (defects per million opportunities).

Analyze - identify the vital few process input variables that affect key product output variables ("Finding the knobs").

Improve - Make changes to process settings, redesign processes, etc. to reduce the number of defects of key output variables.

Control - Implement process control plans, install real-time process monitoring tools, standardize processes to maintain levels.

9. 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

10. Enumerate the steps to benchmark? (NOV/DEC 2016)

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

11. What are the types of benchmarking? (May 2012)

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

12. What are the four basic steps included in SPC?

The four basic steps included in SPC are

- a. Measuring the process
- b. Eliminating variances in the process to make it consistent.
- c. Monitoring the process.
- d. Improving the process to its best target value.

13. 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

14. 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.

15. 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 out 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)

16. What is the use of SPC?

SPC is used to monitor the consistency of processes used to manufacture a product as designed.

17. Define check sheet. Mention its uses.

The check sheet is a data gathering and interpretation tool. A check sheet is used for,

- a. Distinguishing between fact and opinion (Example: How does the community perceive the effectiveness of the school in preparing students for the world of work?)
- b. Gathering data about how often a problem is occurring? (Example: How often are students

missing classes?)

c. Gathering data about the type of problem occurring. (Example: What is the most common type of word processing error created by the students-grammar, punctuation, transposing letter etc.)

18. What are the uses of cause and effect diagram? (NOV/DEC 2016)

a. A cause and effect diagram is used for, a. Identifying potential causes of a problem or issue in an orderly way. (Example: why has membership in the band decreased? Why isn't the phone4 being answered on time? Why is the production process suddenly producing so many defects?)

b. Summarizing major causes under four categories. (Example: People, machines, methods and materials or policies, procedures, people and plant.)

19. What is scatter diagram?

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

20 . Define histogram.

A histogram is used to display in bar graph format measurement data distributed by categories.

21. What are the problems that can be interpreted by the histogram?

The problems that can be interpreted by the histogram are,

a. Skew problems

b. Clustering problems.

22. Define control chart.

Control chart is defined as a display of data in the order that they occur with statistically determined upper and lower limits of expected common cause variations. It is used to indicate special causes of process variations to monitor a process for maintenance and to determine if process changes have has the desired effect.

23. 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.

24. 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 be completed.

PART-B

1. Explain the new seven tools of quality and its applications in detail. **(APRIL/MAY 2008) (R)**
2. Discuss about the need, types, construction, and applications of control charts. **(APRIL/MAY 2008) (U)**
3. Explain the different types of control charts available for problem solving. Enumerate on the different patterns commonly noticed in control charts. **(APRIL/MAY 2009) (U)**
4. With a specific application compare the affinity diagram and relationship diagram in terms of getting highly creative solutions for managerial problems. **(APRIL/MAY 2009) (U)**
- 5 i Explain the relevance of 6-sigma concept in achieving quality output in a process. **(U)** ii Give an example of a company practicing six-sigma concept. **(NOV/DEC 2011) (R)**
- 6 i What is Benchmarking and why do the organizations adopt this technique? **(R)** ii Explain the Benchmarking process. **(NOV/DEC 2011) (R)**
- 7 i 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”. **(U)** ii. Describe how simultaneous or concurrent design is better over sequential design in guarantying to the end users. **(APRIL/MAY 2012) (U)**
8. Prepare a FMEA work sheet for an induction motor’s shaft failure or a failure of your choice. **(Apr/May 2015) (U)**
9. i. With an example illustrate how benchmarking can help a system to improve both efficiency and effectiveness of a system. **(U)** ii. With examples explain the concept of six sigma. **(APRIL/MAY 2012) (R)**
10. Discuss the new seven tools in detail with their typical application. **(NOV/DEC 2012) (NOV/DEC 2016) (U)**
11. Discuss the reasons for benchmarking and state the advantages and limitations. **(NOV/DEC 2012) (U)**

UNIT IV**TQM TOOLS & TECHNIQUES II**

SYLLABUS: Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

PART-A**1. What is a QFD?**

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

2. What are the benefits of QFD

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

3. 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

4. What are the goals of TPM? (MAY 2010)

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

5. 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

6. 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

7. Define TPM? (MAY 2011)

T : Total = All-encompassing by maintenance and production individuals working together

P : Productive = Production of goods and services that meet or exceed customer's expectations.

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

8. Define quality cost.

Quality cost is defined as the cost associated with the non-achievement of product/service quality as defined by the requirements established by the organisation and its contracts with customers and society.

9. List the categories of quality costs.

The categories of quality cost are

- 1. Cost of prevention
- 2. Cost of appraisal
- 3. Cost of internal failures and
- 4. Cost of external failures.

10. What is meant by cost of prevention?

Prevention costs are the costs that are incurred on preventing a quality problem from arising.

11. List the elements of cost of prevention.

The elements of cost of prevention are

- 1. Cost of quality planning
- 2. Cost of documenting
- 3. Process control cost
- 4. Cost of training
- 5. Costs associated with preventing recurring defects.

12. What is cost appraisal? (MAY 2012)

Appraisal costs are the cost that are incurred in assessing that the products/services conform to the requirements

13. What are the costs of appraisal?

The costs of appraisal are

1. Cost of receiving test and equipment
2. Cost of Laboratory acceptance testing
3. Cost of installation testing
4. Cost of installation and commissioning
5. Cost of maintenance and calibration of testing and inspecting equipments.

14. What is meant by cost of internal failures?

The costs associated with defective products, components and materials that fail to meet quality requirements and result in manufacturing losses are called as costs of internal failures. These costs are linked to correcting mistakes before delivery of the product

15. List the components cost of internal failures.

The costs of internal failures are

1. Cost associate with scrap and rejects.
2. Cost of repair and rework.
3. Cost of design changes.
4. Cost of trouble shooting
5. Cost of reinsertion and retesting. etc;

16. What is meant by cost of external failures?

It consist of the cost which are generated because of defective products being shipped to customers. These cost are associated with the adjustments of malfunctions after delivery of the product.

17. Give the sub-elements of Preventive cost category?

- i. Marketing/Customer/User
- ii. Product/Service/Design development
- iii. Purchasing
- iv. Operations/
- v. Quality Administration
- vi. Other Prevention Costs

18. Give the sub-elements of Appraisal cost category?

- i. Purchasing appraisal cost

- ii. Operations appraisal cost
- iii. External appraisal cost
- iv. Review of test and application data
- v. Miscellaneous quality evaluations

19. Give the sub-elements of Internal failure cost category?

- i. Product or Service Design costs (Internal)
- ii. Purchasing failure costs
- iii. Operations failure costs

20. Give the sub-elements of External failure cost category?

- i. Complaint investigations of customer or user service
- ii. Returned goods
- iii. Retrofit and recall costs
- iv. Warranty claims
- v. Liability costs
- vi. Penalties
- vii. Customer or user goodwill
- viii. Lost sales
- ix. Other external failure costs

21. Give the typical cost bases?

- i. Labour
- ii. Production
- iii. Unit
- iv. Sales

22. How will you determine the optimum cost?

- a. Make comparison with other organizations
- b. Optimize the individual categories
- c. Analyze the relationships among the cost categories

23. What are the functions of quality circles (MAY/JUNE 2013) /(NOV/DEC 2013)

quality circle is a volunteer group composed of workers (or even students), who do the same or similar work, usually under the leadership of their own supervisor (or an elected team leader), who meet regularly in paid time who are trained to identify, analyze and solve work-related problems and present their solutions to management

24. Define “Taguchi’s Quality Loss Function” (TQLF). (Apr/May 2015)

The Taguchi quality loss function is a way to assess economic loss from a deviation in quality without having to develop the unique function for each quality characteristic. As a function of the traditionally used process capability index, it also puts this unitless value into monetary units.

25. Indicate the different parameters used for quality performance measurement. (Apr/May 2015)

There are four types of performance measures

- α. Process measure
- β. Outcome measure
- χ. Balancing measure
- δ. Structure of care measure

SCORE

PART-B

1. Discuss about the objectives, process, outcome and benefits of quality functional deployment (QFD). **(APRIL/MAY 2008) (U)**
2. Explain briefly about the following
 - i. Taguchi quality loss function. **(R)**
 - ii. Pillars of TPM and its Benefits. **(APRIL/MAY 2008) (Apr/May 2015) (R)**
3. Describe the different benchmarking metrics that can be used in educational institutions. **(APRIL/MAY 2009) (R)**
4. Explain the different steps involved in Failure Mode Effect Analysis with an example. **(APRIL/MAY 2009) (R)**
- 5 Explain the seven steps plan to establish the TPM in an organization in detail. **(NOV/DEC 2011) (R)**
- 6 Explain the concept of Taguchi's quality loss function in detail. Give an example **(NOV/DEC 2011) (R)**
7. Devise a QFD methodology for design and development of cups used in vending machine for dispersing hot and cold beverages. **(APRIL/MAY 2012) (U)**
8. i. Discuss the benefits of QFD. **(U)**
 - ii. For an out of round condition (smaller the better) of a steel shaft, the true indicator readings for eight shafts are 0.05,0.04,0.04,0.03,0.04,0.02,0.04 and 0.03 mm, **(APRIL/MAY 2012) (U)**
 1. If the average loss at 0.03 is Rs.15, what is the loss function?
 2. What is the loss at 0.05?
 3. What is the average loss?
- 9 i) What are the goals of TPM and explain the six losses in TPM? **(R) ii**
Explain the components of Quality costs. **(NOV/DEC 2012) (R)**
- 10 Write notes on :
 - i. QFD
 - ii Quality circles
 - iii Typical performance measures of TQM. **(NOV/DEC 2012) (R)**
11. With suitable example explain various stages of building a house of quality matrix. **(MAY/JUNE 2013) (R)**
- 12.i Explain the different types of cost contributing to the cost of quality. **(R)**
 - ii Explain the Taguchi's quadratic quality loss function. How it differs from traditional approach of quality loss cost? **(MAY/JUNE 2013) (R)**

UNIT-V**QUALITY SYSTEMS**

SYLLABUS: Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service sectors.

PART-A**1. Give the ISO 9000 Series of Standards? (NOV/DEC 2016)**

- i. ISO 9000, “Quality Management and Quality Assurance Standards Guidelines for Selection and Use”.
- ii. ISO 9001, “Quality Systems – Model for Quality Assurance in Design, Development, Production, Installation & Servicing”.
- iii. ISO 9002, “Quality Systems – “Model for Quality Assurance in Production, Installation & Servicing”.
- iv. ISO 9003, “Quality Systems – “Model for Quality Assurance in Final Inspection and Test”.
- v. ISO 9004-1, “Quality Management and Quality System Elements – Guidelines”.

2. What is the need for ISO 9000? (MAY 2010)

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.

3. Give some other quality systems?

The quality systems

are i. QS-9000

i. QS-9000

ii. TE-9000

iii. AS9000

4. Enumerate the steps necessary to implement the Quality Management System?

The steps necessary to implement the Quality Management System are

- i. Senior management commitment
- ii. Appoint the management representative
- iii. Awareness
- iv. Appoint an implementation team
- v. Training
- vi. Time schedule
- vii. Select element owners
- viii. Review the present system
- ix. Write the documents

- x. Install the new system
- xi. Internal audit
- xii. Management review
- xiii. Pre assessment
- xiv. Registration.

5. What are the three sections of QS-9000?

The three sections of QS-9000 are

- i. Common requirements, which include the exact text of ISO 9001 and the addition of automotive/heavy trucking requirements.
- ii. Additional requirements covering production part approval process, continuous improvement and manufacturing capabilities.
- iii. Customer-specific requirements.

6. Give the objectives of the internal audit? (May 2011)

The objectives of the internal audit

- a) Determine the actual performance conforms to the documented quality systems.
- 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.
- e) Cause the auditee to think about the process, thereby creating possible improvements.

7. What are the requirements of ISO 14001?

The requirements of ISO 14001 are

- i. General requirements
- ii. Environmental policy

- iii. Planning
- iv. Implementation and operation
- v. Checking and corrective action
- vi. Management review

8. What are the benefits of ISO 14000? (May 2012)

The benefits of ISO 14000 are a. Global

- i. Facilitate trade and remove trade barriers
- ii. Improve environmental performance of planet earth
- iii. Build consensus that there is a need for environment management and a common terminology for EMS.

9. What are the four elements for the checking & corrective action of ISO 14001?

- a) Monitoring and measuring
- b) Non-conformance and corrective and preventative action
- c) Records
- d) EMS audit

10. What are the seven elements for the implementation & operations of ISO 14001?

- a) Structure and responsibility
- b) Training, awareness and competency
- c) Communication
- d) EMS documentation
- e) Documentation control
- f) Operational control
- g) Emergency preparedness and response

11. What are the four elements for the planning of ISO 14001?

- a) Environmental aspects
- b) Legal and other requirements
- c) Objectives and targets
- d) Environmental Management Programs

12. Give the types of Organizational Evaluation Standards?

- i. Environmental Management System
- ii. Environmental Auditing
- iii. Environmental Performance Evaluation

13. Give the types of Product Evaluation Standards?

- i. Environmental Aspects in Product Standards
- ii. Environmental Labelling
- iii. Life-Cycle Assessment

14. Define Quality Audits?

Quality Audits examine the elements of a quality management system in order to evaluate how well these elements comply with quality system requirements.

15. Give the usage of an effective recognition and reward system?

- Serves as a continual reminder that the organization regards quality and productivity as important.
- Offers the organization a visible technique to thank high achievers for outstanding performance.
- Provides employees a specific goal to work toward. It motivates them to improve the process.
- Boosts morale in the work environment by creating a healthy sense of competition among individuals and teams seeking recognition.

16. What are the typical measurements frequently asked by managers and teams?

- Human Resource
- Customers
- Production
- Research & Development
- Suppliers
- Marketing/Sales
- Administration

17. Explain the ISO/QS 9000 elements? i.

- i. Management responsibility
- ii. The Quality system
- iii. Contract review
- iv. Design control
- v. Document and data control
- vi. Purchasing
- vii. Control of customer-supplied product
- viii. Product identification and traceability
- ix. Process control
- x. Inspection and testing
- xi. Control of inspection, measuring and test equipment
- xii. Inspection and test status

18. What are the benefits of ISO?

Fewer on-site audit by customers.

- Increased market share.
- Improved quality, both internally and externally.
- Improve product and service quality levels from suppliers.
- Greater awareness of quality by employees.
- A documented formal system.
- Reduced operating costs.

19. Give the ISO 9001 requirements?

- Scope
- Normative Reference
- Terms and Definitions
- Quality Management System
- Management Responsibility
- Resource Management
- Product Realization

20. What are the methods of actual audit?

- i. Examination of documents
- ii. Observation of activities
- iii. Interviews

21. What are organization standards and product standards (MAY/JUNE 2013)

A standard is a document. It is a set of rules that control how people develop and manage materials, products, services, technologies, processes, and systems. ISO's standards are agreements. ISO refers to them as agreements because its members must agree on content and give formal approval before they are published. ISO standards are developed by technical committees. Members of these technical committees come from any countries. Therefore, ISO standards tend to have very broad support.

22. What is the concept of environmental management system (MAY/JUNE 2013)

A **management system** is the framework of processes and procedures used to ensure that an organization can fulfill all tasks required to achieve its objectives

Examples of management system standards include:

- ISO 9001 Quality Management,
- ISO 14001 Environmental Management,
- ILO-OSH Occupational Safety & Health Management Systems,
- ISO/IEC 27001 Information Security Management,

- SA8000 Social Accountability.

23. Why is a quality system required (MAY/JUNE 2014)

Quality system is required because every organization, both management and the general workforce tend to resist change, whether it be in systems, culture or environment. That is natural – people are usually happy to continue with what they have always done. The change brought about by the introduction of a quality management system (QMS) – particularly in service industries – is no exception.

24. What are the objectives of ISO 9000 Standards (MAY/JUNE 2014), (NOV/DEC 2013)

- Achieve, maintain, and improve product quality
- Improve quality of operations to continually meet customers' and stakeholders' needs
- Provide confidence to management, employees, customers, and stakeholders that quality requirements are fulfilled

25. What is internal quality audit and external quality audit (NOV/DEC 2013)**Internal quality Audit:**

Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance processes."

External quality Audit:

External Quality Audit looks at the experience of countries where external quality audits have been established by governments, and provides analyses of their effectiveness in improving quality assurance in universities and other higher education institutions.

PART-B

1. Explain about the philosophy and the requirements of ISO 9000:2000 **(APRIL/MAY 2008) (R)**
2. i. Discuss about the documentation process in ISO 9000:2000 system. **(U)**
ii. Explain about the auditing process and role of external agencies **(APRIL/MAY 2008) (R)**
3. Remember the different types of quality audits available in practice and explain when each has to be carried out? **(APRIL/MAY 2009) (R)**
- 4.i.Explain the requirements of Environmental Management Systems.**(R)**
ii Discuss the benefits of environmental management systems.(8) **(APRIL/MAY 2009) (U)**
- 5i.Explain the benefits of EMS.**(R)**
ii Discuss quality auditing in detail. **(NOV/DEC 2011) (U)**
- 6 Discuss the implementation of TQM with a case study from the manufacturing industry. **(NOV/DEC 2011) (U)**
7. i Discuss the need for standardization procedures for quality assurance. Explain the requirements of ISO system of documentation. **(U)**
ii. Explain the term quality cost **(APRIL/MAY 2012) (R)**
8. i Differentiate between external and internal audits on quality.**(U)**
ii. Differentiate between ISO 9000 and QS 14000.List the benefits that a firm would enjoy by implementing these series of quality documentation procedures. **(An) (APRIL/MAY 2012)**
- 9 i Discuss the elements of ISO 9000:2000 quality system **(U)**
ii What are the gains realized by a company with the TQM implementation. **(NOV/DEC 2012) (R)**
10. What methodology would you suggest to implement TQM in an automobile manufacturing? Company? **(NOV/DEC 2012) (R)**
- 11.i. Explain the major clauses of QS 9000 standards. **(Apr/May 2016) (R)**
ii. Discuss the benefits of ISO 9000 certification. **(MAY/JUNE 2013) (R)**
12. Remember and explain the elements of ISO 9000 quality system. **(MAY/JUNE 2013) (R)**