

Chapter 16—Implementing Quality Concepts

LEARNING OBJECTIVES

LO 1	What is quality, and from whose viewpoint should it be evaluated?
LO 2	What is benchmarking, and why do companies engage in it?
LO 3	Why is total quality management a significant management philosophy, and what conditions are necessary to yield its benefits?
LO 4	What types of quality costs exist, and how are those costs related?
LO 5	How is cost of quality measured?
LO 6	How can the balanced scorecard and cost management system be used to provide information on quality in an organization?
LO 7	How can quality be instilled as part of an organization's culture?
LO 8	(Appendix) What international quality standards exist?

QUESTION GRID

True/False											
	Difficulty Level			Learning Objectives							
	Easy	Moderate	Difficult	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
1	X			x							
2		x		x							
3		x		x							
4	X			x							
5		x		x							
6		x		x							
7		x		x							
8		x			x						
9		x			x						
10		x			x						
11		x			x						
12		x				x					
13		x				x					
14		x				x					
15		x				x					
16		x				x					
17		x					x				
18		x					x				
19		x					x				
20		x					x				
21		x					x				
22		x					x				
23		x					x				
24		x						x			
25	X								x		
26	X									x	
27		x									x
28		x									x

Completion											
	Difficulty Level			Learning Objectives							
	Easy	Moderate	Difficult	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
1	X			x							
2	X				x						
3		x			x						
4		x			x						
5		x			x						

	Difficulty Level			Learning Objectives							
	Easy	Moderate	Difficult	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
6	X						x				
7		x					x				
8		x					x				
9		x					x				
10		x					x				
11		x					x				

Multiple Choice

	Difficulty Level			Learning Objectives							
	Easy	Moderate	Difficult	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
1	X			x							
2	X			x							
3		x		x							
4	X			x							
5	X			x							
6	X			x							
7	X			x							
8	X			x							
9		x		x							
10	X			x							
11		x		x							
12		x		x							
13	X				x						
14	X				x						
15		x			x						
16		x			x						
17		x			x						
18	X				x						
19	X				x						
20		x			x						
21		x				x					
22		x				x					
23	X					x					
24	X					x					
25	X					x					
26	X						x				
27	X						x				
28	X						x				
29	X						x				
30	X						x				
31	X						x				
32	X						x				
33	X						x				
34	X						x				
35	X						x				
36	X							x			
37	X							x			
38	X							x			
39	X							x			
40		x							x		
41	X								x		
42		x							x		
43	X										x
44	X										x
45	X										x
46	X										x
47		x					x				
48		x					x				
49		x					x				
50		x					x				
51		x					x				

	Difficulty Level			Learning Objectives							
	Easy	Moderate	Difficult	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
52		x					x				
53		x					x				

Short Answer

	Difficulty Level			Learning Objectives							
	Easy	Moderate	Difficult	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
1		x					x				
2		x					x				
3		x				x					
4		x				x					
5		x		x							
6		x				x					
7		x			x						
8		x			x						
9		x				x					

Problem

	Difficulty Level			Learning Objectives							
	Easy	Moderate	Difficult	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
1		x					x				
2		x					x				
3		x					x				
4		x					x				
5		x					x				
6		x					x				
7	x						x				

TRUE/FALSE

1. Productivity is measured by the quantity of good output generated from a specific amount of input during a time period.
ANS: T DIF: Easy OBJ: 16-1
2. Inspection of incoming inventory is a value-adding activity.
ANS: F DIF: Moderate OBJ: 16-1
3. Storage of unneeded inventory is a non-value added item.
ANS: T DIF: Moderate OBJ: 16-1
4. Quality control places the primary responsibility for product or service quality on the provider.
ANS: T DIF: Easy OBJ: 16-1
5. Grade refers to a product meeting the highest number of a customer's needs at the lowest possible cost.
ANS: F DIF: Moderate OBJ: 16-1
6. Grade refers to one of many quality levels that a product or service has relative to the inclusion or exclusion of certain characteristics to satisfy customer needs.
ANS: T DIF: Moderate OBJ: 16-1
7. Value refers to a product meeting the highest number of a customer's needs at the lowest possible cost.
ANS: T DIF: Moderate OBJ: 16-1
8. Strategic benchmarking is industry specific in its approach.
ANS: F DIF: Moderate OBJ: 16-2
9. Process benchmarking is concerned with how top-ranked companies achieve their results.
ANS: T DIF: Moderate OBJ: 16-2
10. Results benchmarking creates the risk for a company to become stagnant.
ANS: T DIF: Moderate OBJ: 16-2
11. Process benchmarking creates the risk for a company to become stagnant.
ANS: F DIF: Moderate OBJ: 16-2
12. A total quality system should place an emphasis on inspection.
ANS: F DIF: Moderate OBJ: 16-3

13. A total quality system should place an emphasis on prevention and continuous improvement.
ANS: T DIF: Moderate OBJ: 16-3
14. Total quality management requires that an organization analyze the costs and benefits of each of its customer segments.
ANS: T DIF: Moderate OBJ: 16-3
15. When implementing TQM, an organization should establish long-term relationships with preferred suppliers.
ANS: T DIF: Moderate OBJ: 16-3
16. When implementing TQM, an organization should establish long-term relationships with as many suppliers as possible.
ANS: F DIF: Moderate OBJ: 16-3
17. Reworking a product is an appraisal cost.
ANS: F DIF: Moderate OBJ: 16-4
18. Reworking a product is an internal failure cost.
ANS: T DIF: Moderate OBJ: 16-4
19. Testing and adjusting manufacturing equipment is a prevention cost.
ANS: T DIF: Moderate OBJ: 16-4
20. Testing and adjusting manufacturing equipment is an appraisal cost.
ANS: F DIF: Moderate OBJ: 16-4
21. Replacing a product after it has been sold is an external failure cost.
ANS: T DIF: Moderate OBJ: 16-4
22. Conducting a quality audit is an appraisal cost.
ANS: T DIF: Moderate OBJ: 16-4
23. Conducting a quality audit is a prevention cost.
ANS: F DIF: Moderate OBJ: 16-4
24. Pareto analysis is frequently used to aid management in deciding where to concentrate quality prevention cost dollars.
ANS: T DIF: Moderate OBJ: 16-5

25. The balanced scorecard can be used to provide information on quality in an organization.

ANS: T DIF: Easy OBJ: 16-6

26. Total quality management (TQM) requires the commitment of all individuals within an organization.

ANS: T DIF: Easy OBJ: 16-7

27. ISO 9000 registration is required for regulated products sold in the United States.

ANS: F DIF: Moderate OBJ: 16-8

28. ISO 9000 registration is required for regulated products sold in the European Union.

ANS: T DIF: Moderate OBJ: 16-8

COMPLETION

1. The quantity of good output generated from a specific of output during a time period is referred to as _____.

ANS: productivity

DIF: Easy OBJ: 16-1

2. The process of investigating, comparing, and evaluating a company's products or services against those of other companies is referred to as _____.

ANS: benchmarking

DIF: Easy OBJ: 16-2

3. A process in which an end product or service is examined using reverse engineering is referred to as _____.

ANS: results benchmarking

DIF: Moderate OBJ: 16-2

4. A benchmarking process that is non-industry specific and focuses on how companies compete is referred to as _____.

ANS: strategic benchmarking

DIF: Moderate OBJ: 16-2

5. A benchmarking process that focuses on how best-in-class companies achieve their results is referred to as _____.

ANS: process benchmarking

DIF: Moderate OBJ: 16-2

6. Costs that preclude product defects resulting from flaws in processing are referred to as _____.

ANS: prevention costs

DIF: Easy OBJ: 16-4

7. Costs of monitoring and compensating for mistakes not eliminated through prevention activities are referred to as _____.

ANS: appraisal costs

DIF: Moderate OBJ: 16-4

8. Costs incurred to correct defects in products prior to shipment are referred to as _____.

ANS: internal failure costs

DIF: Moderate OBJ: 16-4

9. Costs incurred to correct defects in products after shipment are referred to as _____.

ANS: external failure costs

DIF: Moderate OBJ: 16-4

10. The two costs of compliance are _____ and _____.

ANS: prevention costs; appraisal costs

DIF: Moderate OBJ: 16-4

11. The two costs of noncompliance are _____ and _____.

ANS: internal failure costs; external failure costs

DIF: Moderate OBJ: 16-4

MULTIPLE CHOICE

1. An all-inclusive definition of quality views it as the ability of products/services to
- only meet internal design specifications.
 - meet the customer's stated or implied needs.
 - be produced using all value-added production activities.
 - be produced with no rework costs.

ANS: B DIF: Easy OBJ: 16-1

2. Which of the following is **false** as it relates to quality?
- Quality is the total of all characteristics of a product or service that impacts on its ability to meet the needs of a specific person.
 - Quality must always be viewed from the user's perspective.
 - Quality is never concerned with what the user thinks, feels, or deems important.
 - The definition of quality has evolved through time and is more currently comprehensive than in the past.

ANS: C DIF: Easy OBJ: 16-1

3. Productivity is measured by the
- total quantity of output generated from a limited amount of input during a time period.
 - quantity of good output generated from a specific amount of input during a time period.
 - quantity of good output generated from the quantity of good input used during a time period.
 - total quantity of input used to generate total quantity of output for a time period.

ANS: B DIF: Moderate OBJ: 16-1

4. Which of the following can be used to indicate factors that slow down or cause unnecessary work in a process?
- activity analysis
 - total quality management
 - cost of quality
 - all of the above

ANS: A DIF: Easy OBJ: 16-1

5. Which of the following are undesirable from a consumer perspective but are frequently needed?
- value-neutral activities
 - value-added activities
 - non-value-added activities
 - none of the above

ANS: C DIF: Easy OBJ: 16-1

6. Which of the following would typically be viewed as non-value-added activities?

	<u>Moving material</u>	<u>Inspecting raw material</u>	<u>Attaching product components</u>	<u>Storing finished goods</u>
a.	yes	yes	yes	no
b.	no	no	no	yes
c.	no	yes	no	yes
d.	yes	yes	no	yes

ANS: D DIF: Easy OBJ: 16-1

7. _____ places the primary responsibility for quality on the maker or producer.
- Pareto analysis
 - Quality control
 - Benchmarking
 - Activity analysis

ANS: B DIF: Easy OBJ: 16-1

8. All attempts to reduce variability and defects in products reflect the implementation of
- activity analysis.
 - statistical process control.
 - quality control.
 - control charts.

ANS: C DIF: Easy OBJ: 16-1

9. Control charts are appropriate devices in
- total quality control.
 - statistical process control.
 - total quality management.
 - all of the above.

ANS: D DIF: Moderate OBJ: 16-1

10. A control chart graphs
- actual process results relative to a range of acceptable variation.
 - expected process results relative to upper and lower control limits.
 - actual process results relative to value-added and non-value-added activities.
 - the cost of process malfunctions relative to the cost of reducing process variations.

ANS: A DIF: Easy OBJ: 16-1

11. The addition or removal of product or service characteristics to satisfy additional needs, especially price, reflect the _____ of a product or service.
- value
 - grade
 - quality
 - durability

ANS: B DIF: Moderate OBJ: 16-1

12. Value reflects the ability of a product to
- provide the best quality at any price.
 - have all possible product and service characteristics.
 - meet the majority of a customer's needs at the lowest possible price.
 - have the longest technical or service life and the best warranty.

ANS: C DIF: Moderate OBJ: 16-1

13. Comparing the way a "best-in-class" company performs a specific activity (such as distribution) is called
- process benchmarking.
 - results benchmarking.
 - total quality management benchmarking.
 - SPC benchmarking.

ANS: A DIF: Easy OBJ: 16-2

14. Benchmarking allows a company to
- identify its strengths and weaknesses.
 - imitate those ideas that are readily transferable.
 - improve on methods in use by others.
 - all of the above.

ANS: D DIF: Easy OBJ: 16-2

15. Benchmarking against direct competitors creates the risk of
- creating products or services with identical specifications.
 - becoming stagnant relative to process improvements.
 - being taken over by the competitors to prevent a loss of ideas.
 - all of the above.

ANS: B DIF: Moderate OBJ: 16-2

16. Reverse engineering is used in
- statistical process control.
 - process benchmarking.
 - results benchmarking.
 - price fixing.

ANS: C DIF: Moderate OBJ: 16-2

17. Benchmarking against noncompetitors is extremely important in
- process benchmarking.
 - results benchmarking.
 - reverse engineering.
 - all of the above.

ANS: A DIF: Moderate OBJ: 16-2

18. Benchmarking

identifies "best-in-class" companies analyzes the "negative gap"

- | | | |
|----|-----|-----|
| a. | yes | no |
| b. | no | yes |
| c. | yes | yes |
| d. | no | no |

ANS: C DIF: Easy OBJ: 16-2

19. Benchmarking does which of the following activities relative to a "best-in-class" (BIC) company?

- | | Compares BIC's
products and
processes
<u>with own</u> | Copies BIC's
products and
processes
<u>directly</u> | Improves on
BIC's products
and
<u>processes</u> |
|----|--|--|--|
| a. | yes | yes | yes |
| b. | yes | no | no |
| c. | no | no | yes |
| d. | yes | no | yes |

ANS: D DIF: Easy OBJ: 16-2

20. Which of the following is **not** a step in benchmarking procedures?

- a. analyze the "positive gap"
- b. engage in continuous improvement
- c. analyze the "negative gap"
- d. identify "best-in-class" companies

ANS: A DIF: Moderate OBJ: 16-2

21. Which of the following is **not** a critical element in a total quality management system?

- a. employee involvement
- b. activity-based costing
- c. continuous improvement
- d. problem prevention emphasis

ANS: B DIF: Moderate OBJ: 16-3

22. A total quality system should be designed to promote a reorientation of thinking from an emphasis on

- a. internal quality improvements to an emphasis on external benchmarking.
- b. the planning process to an emphasis on the performance evaluation process.
- c. inspection to an emphasis on prevention.
- d. process benchmarking to an emphasis on results benchmarking.

ANS: C DIF: Moderate OBJ: 16-3

23. Which of the following is the first element of knowledge needed by a company wanting to pursue total quality management?

- a. what the company's customers want
- b. who the company's customers are
- c. how the company's processes are designed
- d. what the components of the company's product are

ANS: B DIF: Easy OBJ: 16-3

24. Total quality management is inseparable from the concept of

- a. ISO certification.
- b. centralized organizational structure.
- c. continuous improvement.
- d. the product life cycle.

ANS: C DIF: Easy OBJ: 16-3

25. A company will **not** achieve world-class status unless a quality focus

- a. allows that company to achieve one or more major quality awards.
- b. becomes an integral part of the organization's culture.
- c. emphasizes the elimination of all quality costs for compliance and noncompliance.
- d. has been mandated by management for workers to pursue.

ANS: B DIF: Easy OBJ: 16-3

26. Which of the following statements is **true**?
- The more customers a company has, the better off the company is.
 - A company should spare no expense to provide customer satisfaction.
 - Most customers stop doing business with a company because of poor product or service quality.
 - Cost-benefit analysis can help identify customers that cost more than they are worth to the company.

ANS: D DIF: Easy OBJ: 16-4

27. The four categories of product quality costs are
- external failure, internal failure, prevention, and carrying.
 - external failure, internal failure, prevention, and appraisal.
 - external failure, internal failure, training, and appraisal.
 - warranty, product liability, training, and appraisal.

ANS: B DIF: Easy OBJ: 16-4

28. The number of product defects discovered by consumers is what kind of performance indicator?

<u>Qualitative</u>	<u>Quantitative</u>	<u>Financial</u>	<u>Nonfinancial</u>
a. yes	no	no	yes
b. no	yes	no	yes
c. no	yes	yes	no
d. yes	no	no	yes

ANS: B DIF: Easy OBJ: 16-4

29. Money spent on employee training is a
- prevention cost.
 - appraisal cost.
 - empowerment cost.
 - Pareto cost.

ANS: A DIF: Easy OBJ: 16-4

30. Production quality is affected by
- worker productivity.
 - the amount of failure costs incurred.
 - worker skill level.
 - just-in-time suppliers.

ANS: C DIF: Easy OBJ: 16-4

31. Mistakes **not** eliminated by prevention costs may cause

<u>appraisal costs</u>	<u>failure costs</u>
a. no	no
b. no	yes
c. yes	no
d. yes	yes

ANS: D DIF: Easy OBJ: 16-4

32. Product quality includes all of the following **except**

- a. appeal.
- b. performance.
- c. durability.
- d. price.

ANS: D

DIF: Easy

OBJ: 16-4

33. Recalls are fairly common events for automobile manufacturers. The costs of recalling and repairing a car create

<u>internal failure costs</u>	<u>external failure costs</u>	<u>prevention costs</u>
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- | | | |
|--------|-----|-----|
| a. yes | yes | no |
| b. yes | yes | yes |
| c. no | yes | no |
| d. yes | no | yes |

ANS: A

DIF: Easy

OBJ: 16-4

34. An appraisal cost is created by

- a. installing automated technology.
- b. reworking products.
- c. verifying procedures.
- d. rescheduling and setup.

ANS: C

DIF: Easy

OBJ: 16-4

35. Compliance costs include

<u>prevention costs</u>	<u>appraisal costs</u>	<u>internal failure costs</u>
-------------------------	------------------------	-------------------------------

- | | | |
|--------|-----|-----|
| a. yes | no | no |
| b. no | yes | yes |
| c. yes | yes | no |
| d. yes | yes | yes |

ANS: C

DIF: Easy

OBJ: 16-4

36. Management can decide where to concentrate its quality prevention dollars using

- a. statistical process control charts.
- b. just-in-time inventory systems.
- c. a feedback loop.
- d. Pareto analysis.

ANS: D

DIF: Easy

OBJ: 16-5

37. Historically, the cost of quality has been

- a. included in account balances for items such as Work in Process Inventory and marketing expenses.
- b. detailed in various "cost of quality" account balances on the Income Statement.
- c. immaterial because no accounts were developed to detail these amounts.
- d. generally spent in the prevention rather than the appraisal category.

ANS: A

DIF: Easy

OBJ: 16-5

38. A significant cost of quality that is **not** recorded in the accounting records is the
- failure cost for a customer complaint center.
 - cost of reworking products to bring them up to specification.
 - opportunity costs of forgone future sales.
 - appraisal cost for product equipment.

ANS: C DIF: Easy OBJ: 16-5

39. A cost of quality report compares current period quality costs in specified categories to
- last year's quality costs.
 - current period budgeted quality costs.
 - total quality costs for the period.
 - both a and b.

ANS: D DIF: Easy OBJ: 16-5

40. Which of the following is **not** one of the three objectives of a quality program?
- Product quality should be consistent to always meet the purchaser's need(s).
 - A quality program should give management confidence that the quality is and will be at a constant level.
 - A quality program should give customers confidence that the intended quality will be achieved in products.
 - Product quality should always vary because customers change their wants and needs over time.

ANS: D DIF: Moderate OBJ: 16-6

41. The most visible embodiment of total quality management in the United States is
- being awarded the Deming Prize.
 - achieving ISO 9000 certification.
 - meeting industry standards.
 - receiving the Baldrige Award.

ANS: D DIF: Easy OBJ: 16-6

42. Which of the following are categories judged for the Baldrige Award?

	<u>Benchmarking</u>	<u>Business results</u>	<u>Use of SPC and Pareto analysis</u>	<u>Customer focus</u>	<u>Leadership</u>
a.	no	yes	no	yes	yes
b.	yes	yes	yes	yes	yes
c.	yes	yes	no	yes	no
d.	no	no	no	no	no

ANS: A DIF: Moderate OBJ: 16-6

43. The ISO 9000 series refers to
- international guidelines for quality standards.
 - provisions regarding benchmarking activities in the European Union.
 - guidelines for appropriate expenditures on the various categories of quality costs.
 - all of the above.

ANS: A DIF: Easy OBJ: 16-8

44. The ISO 9000 standards
- indicate which companies' products are better than those of competitors.
 - allow management to decide how to meet the standards for quality assurance.
 - include specific directives about product design, material procurement, and environmental responsibilities.
 - compose a program of quality assurance under which companies are registered by the International Organization for Standardization.

ANS: B DIF: Easy OBJ: 16-8

45. A quality audit involves a review of

	<u>manufacturing processes</u>	<u>cost of quality standards</u>	<u>quality documentation</u>
a.	yes	yes	yes
b.	no	yes	yes
c.	no	no	no
d.	yes	no	yes

ANS: D DIF: Easy OBJ: 16-8

46. Registration under ISO 9000 is
- required for all companies doing business internationally.
 - required for all European companies doing business in Europe.
 - not required for U.S. companies unless they use European suppliers.
 - required for all companies producing regulated products to be sold in the European Union.

ANS: D DIF: Easy OBJ: 16-8

Variance Corporation

Variance Corporation is a manufacturer of a versatile statistical calculator. The following information is a summary of defective and returned units for the previous year.

Total defective units	1,000
Number of units reworked	750
Number of customer units returned	150
Profit for a good unit	\$40
Profit for a defective unit	\$25
Cost to rework a defective unit	\$10
Cost of a returned unit	\$15
Total prevention cost	\$10,000
Total appraisal cost	\$5,000

47. Refer to Variance Corporation. The profit lost by selling defective units **not** reworked is
- \$25,000.
 - \$15,000.
 - \$18,750.
 - \$3,750.

ANS: D

250 units not reworked * \$15 incremental difference = \$3,750

DIF: Moderate OBJ: 16-4

48. Refer to Variance Corporation. The total rework cost is
- \$7,500.
 - \$15,000.
 - \$2,500.
 - \$3,750.

ANS: A

750 units reworked * \$10/unit rework cost = \$7,500

DIF: Moderate OBJ: 16-4

49. Refer to Variance Corporation. The cost of processing customer returns is
- \$9,000.
 - \$2,500.
 - \$22,500.
 - \$2,250.

ANS: D

150 returned units * \$15/unit = \$2,250

DIF: Moderate OBJ: 16-4

50. Refer to Variance Corporation. The total failure cost is
- \$15,000.
 - \$13,500.
 - \$11,250.
 - \$8,250.

ANS: B

750 units reworked * \$10/unit	\$ 7,500
150 units returned * \$15/unit	2,250
250 units not reworked * \$15/unit	<u>3,750</u>
Total	\$13,500
	=====

DIF: Moderate OBJ: 16-4

51. Refer to Variance Corporation. The total quality cost is
- \$15,000.
 - \$15,750.
 - \$28,500.
 - \$11,250.

ANS: C

Total failure costs	\$13,500
Total prevention costs	10,000
Total appraisal costs	<u>5,000</u>
Total quality costs	\$28,500
	=====

DIF: Moderate OBJ: 16-4

52. Refer to Variance Corporation. The profit lost by selling defective units to Greenstein Company totals \$1,440. The total rework cost for 700 units is \$28,000. The difference between the profit earned on a good unit and a defective unit is \$12. How many total defective units did Variance Corporation produce?
- 120
 - 740
 - 736
 - 820

ANS: D

Defective units sold \$1,440/\$12 per unit	120 units
Units reworked	<u>700 units</u>
Total defective units	820 units =====

DIF: Moderate OBJ: 16-4

53. Denison Company's cost of compliance is \$58,000. Appraisal cost is \$21,000 and failure cost is \$32,000. The company's total quality cost is
- \$53,000.
 - \$79,000.
 - \$90,000.
 - \$111,000.

ANS: C

Cost of compliance	\$58,000
Failure cost	<u>32,000</u>
Total quality cost	\$90,000 =====

DIF: Moderate OBJ: 16-4

SHORT ANSWER

1. Discuss the four categories of quality costs.

ANS:

Prevention costs are incurred to prevent product or service defects and decrease the number of nonconforming units produced. These costs include items such as quality training programs, quality reporting, quality audits, and quality circles. Raw material vendors are selected with the understanding that all delivered materials meet acceptable quality limits.

Appraisal costs arise from determining whether products are in agreement with their specifications. These costs include inspection of raw material, supervising appraisal activities, and product acceptance or sampling finished batches to see if they meet specifications.

Failure costs make up the other two types of quality costs. Internal failure costs result when the products don't meet specifications and must be reworked or discarded. These costs include scrap, rework, retesting, and design changes. High-quality prevention should eliminate internal failure costs. External failure costs occur when buyers note defects after delivery. These costs can be very high and include lost sales from poor performance of the product, returns due to poor quality, warranties, and product liability.

DIF: Moderate OBJ: 16-4

2. What is the relationship between the incurrence of the various types of quality costs and the quantity of output that meets specification?

ANS:

As the number of conforming units increases, both types of failure costs decrease rapidly. To decrease failure costs, more prevention costs must be incurred. Identifying defective products before they leave the factory can decrease the external failure costs immensely. Although, such identification may increase internal failure costs. A greater emphasis on prevention will decrease appraisal costs and also failure costs. Thus, over time, overall quality costs will decrease.

DIF: Moderate OBJ: 16-4

3. What is continuous improvement? How does it relate to total quality management?

ANS:

Continuous improvement is behavior that encourages employees, either production or service, to perform their tasks better as time passes. Thus, because product or service quality levels improve, continuous improvement is directly related to TQM. Employees are also encouraged to "group think" and brainstorm in quality circles to recognize and correct problems in the business environment.

DIF: Moderate OBJ: 16-3

4. Discuss the concept of total quality management.

ANS:

TQM is a company-wide quality system that emphasizes employee involvement in improving product or service quality throughout the firm. It uses a continuous improvement process that is always striving to update upon the existing system. It uses techniques that encourage employees to make suggestions about how the product or production process can be improved. TQM necessitates an internal managerial system of decision making, controlling, and planning. TQM involves continuous improvement that exceeds customer/client expectations.

DIF: Moderate OBJ: 16-3

5. How do control charts mesh with the concept of total quality control (TQC)?

ANS:

Control charts are graphical, statistical presentations that identify occurrences of products or services as to whether they fall within some measure of performance. Upper and lower limits of acceptability are displayed on the chart. TQC expects all products to meet specifications. Thus, no measures of units or services performed should exceed these limits.

DIF: Moderate OBJ: 16-1

6. Discuss the relationship between benchmarking and total quality management (TQM).

ANS:

TQM is a system of the organization that emphasizes continuous improvement processes that meet or exceed customer quality expectations. It emphasizes quality principles throughout the firm. Benchmarking is the process of investigating, comparing, and evaluating a company's processes, products, and/or services against those of companies believed to be the "best in class." Benchmarking stresses quality improvement by finding out how other firms are doing what you do better and attempting to pattern your own processes after what these firms are doing and striving to improve those processes. Benchmarking has been implemented by many firms that have adopted JIT and that have insisted their suppliers do the same. These firms gain insight on how to follow JIT by communicating with other firms.

DIF: Moderate OBJ: 16-3

7. Compare and contrast results benchmarking and process benchmarking.

ANS:

Results benchmarking is associated with quality but is concerned with whether the final product meets product/service specifications. Process benchmarking focuses on practices of competitors or non-competitors that are considered "best-in-class" and tries to adopt features with which the questioning company has problems

DIF: Moderate OBJ: 16-2

8. Discuss increased competition and improved problem solving skills as they relate to benchmarking.

ANS:

Increased competition and improved problem solving skills are two benefits of benchmarking. Benchmarking helps companies become more competitive in their markets by examining what competitors do in relation to organization practices. Once these differences are determined, the organization will be in a better position to make changes that will help make the organization more competitive. Benchmarking also increases problem-solving skills among employees in the organization by providing a framework in which to operate more effectively. An increase in problem solving ability should promote teamwork with the organization, which is critical to not only benchmarking, but to total quality control.

DIF: Moderate OBJ: 16-2

9. What are the four tenets of total quality management (TQM)?

ANS:

1. To dictate continuous improvement for an internal managerial system of planning, controlling, and decision making for continuous improvement.
2. To require participation by everyone in the organization.
3. To focus on improving goods and services from the customer's point of view.
4. To value long-term partnerships with suppliers.

DIF: Moderate OBJ: 16-3

PROBLEM

Cokesbury Corporation

Cokesbury Corporation is a manufacturer of electronic blood pressure monitors for home use. The following is a summary of quality costs for the first year of operations.

Total defective units	1,500
Number of units reworked	800
Number of customer units returned	200
Profit for a good unit	\$50
Profit for a defective unit	\$30
Cost to rework a defective unit	\$12
Cost of a returned unit	\$20
Total prevention cost	\$17,500
Total appraisal cost	\$9,500

1. Refer to Cokesbury Corporation. Compute the profit lost by selling defective units not reworked.

ANS:

$$Z = (D - Y) (P_1 - P_2) = (1,500 - 800)(\$50 - \$30) = \$14,000$$

DIF: Moderate OBJ: 16-4

2. Refer to Cokesbury Corporation. Compute the total rework cost.

ANS:

$$R = (Y) (r) = (800) (\$12) = \$9,600$$

DIF: Moderate OBJ: 16-4

3. Refer to Cokesbury Corporation. Compute the cost of processing customer returns.

ANS:

$$W = (D_r) (w) = (200) (\$20) = \$4,000$$

DIF: Moderate OBJ: 16-4

4. Refer to Cokesbury Corporation. What is the total failure cost?

ANS:

$$F = Z + R + W = \$14,000 + \$9,600 + \$4,000 = \$27,600$$

DIF: Moderate OBJ: 16-4

5. Refer to Cokesbury Corporation. Determine the total quality cost.

ANS:

$$T = K + A + F = \$17,500 + \$9,500 + \$27,600 = \$54,600$$

DIF: Moderate OBJ: 16-4

Seating Concepts

Seating Concepts has just finished its first year of business. Seating Concepts makes decorative outdoor furniture. The firm manufactured 2,500 pieces of furniture during the year: 2,400 were sold at garden centers for \$456,000; 100 pieces were defective and could only be sold as scrap metal (25 pounds each and can be sold for \$2.50 per pound). No defective units could be reworked. During the year the following costs were incurred:

Total appraisal cost	\$9,000
Total prevention cost	25,700
Total production cost	250,000
Total selling and administrative cost	70,000

6. Refer to Seating Concepts. Compute the total profits lost by the company from selling scrap units during its first year of operations.

ANS:

$$\text{Price for good units: } \$456,000 \div 2,400 = \$190$$

$$\text{Price for defective units: } \$6,250^* \div 100 = \$62.50$$

$$^*25 \text{ pounds} \times 100 \text{ pieces} \times \$2.50/\text{pound}.$$

$$\text{Profits lost: } 100 \times (\$190.00 - \$62.50) = \$12,750$$

DIF: Moderate OBJ: 16-4

7. Refer to Seating Concepts. Compute the total quality cost incurred by the company during the first year of operations.

ANS:

Prevention cost	\$25,700
Appraisal cost	9,000
Total failure cost	<u>12,750</u>
	<u>\$47,450</u>

DIF: Easy OBJ: 16-4