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CHAPTER 2

QUALITY MANAGEMENT

CHAPTER LEARNING OBJECTIVES

1. ***Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.*** In our discussion of quality management in this chapter, certain consistencies or commonalities have surfaced. The most important perspective of quality is the customer's: products and services must be designed to meet customer expectations and needs for quality.

2. ***Discuss the evolution of quality management into a quality management system, including key figures and their contributions.*** To make sure that products and services are designed to meet customer expectations, a strategy to achieve quality throughout the organization is required. This approach to the management of quality throughout the entire organization has evolved into what is generally referred to as a QMS, which implies a total commitment to quality throughout the organization and the supply chain.

3. ***Use several common quality-control tools.*** A major cornerstone of the quality-improvement process is the need to identify and prevent the causes of quality problems or defects. A number of tools to identify the causes of quality problems are widely used today, including process flowcharts, cause-and-effect diagrams, check sheets, histograms, Pareto charts, scatter diagrams, and statistical process control (SPC) charts. These popular tools became the basis for the quality management programs developed by many companies, including Six Sigma and Lean Six Sigma QMSs.

4. ***Describe several approaches used for involving employees in the quality-improvement process.*** A total commitment to quality is necessary throughout an organization for it to be successful in improving and managing product quality. This commitment must start at the top and filter down through all levels of the organization and across all areas and departments. Employees need to be active participants in the quality-improvement process and must feel a responsibility for quality. Employees must feel free to make suggestions to improve product quality, and a systematic procedure is necessary to involve workers and solicit their input.

5. ***Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.*** Six Sigma was first developed at Motorola as a project-oriented methodology that provides businesses with the tools and expertise to improve their processes. This increase in performance through a decrease in process variation leads to defect reduction and an increase in product and service quality and increased profits. A number of companies have credited Six Sigma with billions of dollars in cost savings and increased profits, and these reported successes have led many other large and small companies to adopt all or some of the Six Sigma methodology. As a result, Six Sigma is currently one of the most popular QMSs in the world.

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6. ***Classify quality-related costs and calculate and interpret quality-measurement indices.*** Improving product quality is cost effective; the cost of poor quality greatly exceeds the cost of attaining good quality. Quality can be improved with the effective use of statistical quality-control methods. In fact, the use of statistical quality control has been a pervasive part of our discussions on quality management, and it has been identified as an important part of any quality-management program. In the following chapter, we concentrate on statistical quality-control methods and principles.

7. ***Use several quality measures that reflect productivity.*** Finally, a QMS can not only help to reduce quality-related costs and improve market share and profitability, but also improve productivity. In fact, virtually all aspects of quality improvement have a favourable impact on different measures of productivity. Improving product design and production processes, improving the quality of materials and parts, and improving job designs and work activity will all increase productivity.

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TRUE-FALSE STATEMENTS

1. Globalization and foreign competition began to change consumer's attitudes towards quality in the 1950s.

Answer: False

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

2. How well the product or service does what it is intended to do is known as quality of design.

Answer: False

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

3. The degree to which quality characteristics are designed into the product is known as quality of design.

Answer: True

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

4. Quality of performance relates to the basic operating characteristics of a product.

Answer: True

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge

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AACSB: Reflective Thinking

5. The degree to which a product meets pre-established standards is known as quality of conformance.

Answer: True

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

6. The courtesy and competence of the repair person can be one aspect of maintainability.

Answer: False

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

7. The probability that a product will operate properly within an expected time frame is known as quality of performance.

Answer: False

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

8. The dimension of quality related to the life-span of a product before replacement is known as durability.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge

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AACSB: Reflective Thinking

9. Service quality is more directly related to the interaction between customer and employee than is manufacturing quality.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

10. Training, supervision, and control are important elements in achieving quality of conformance.

Answer: True

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

11. The consumer makes the final judgment regarding quality.

Answer: True

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

12. Quality characteristics included in the product's design must be balanced against production costs.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension

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13. Companies that satisfy its customer quality requirements often require the commitment of their suppliers.

Answer: True

Difficulty: Hard
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension
AACSB: Reflective Thinking

14. Most members of a supply chain understand the importance of high quality because they are both customers and suppliers.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension
AACSB: Reflective Thinking

15. Some companies enter into long-term relationships with suppliers who in return commit to meeting only delivery deadlines.

Answer: False

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

16. Benchmarking involves comparing a company's quality to the best level of quality achieved by another company in the same industry.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?

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Blooms: Knowledge
AACSB: Reflective Thinking

17. McDonald's has a reputation for high-quality service resulting from the application of quality management principles.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

18. Quality management principles often do *not* apply to services because the customer has lower quality expectations.

Answer: False

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension
AACSB: Reflective Thinking

19. Toyota achieved high product quality by adapting many of the quality management principles that had first been developed in the United States.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

20. From the producer's perspective, quality is determined by what the consumer wants and is willing to pay for.

Answer: False

Difficulty: Easy
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.

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Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

21. Deming advocated continuous process improvement to reduce variability and achieve conformance to design specifications.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

22. Deming emphasized final product inspection as a way to improve process quality.

Answer: False

Difficulty: Easy
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

23. Deming advocated the elimination of both common cause and special cause variation as a way to improve a process.

Answer: True

Difficulty: Medium
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Comprehension
AACSB: Reflective Thinking

24. Deming emphasized the use of statistical quality control techniques to reduce variability in the output of a process.

Answer: True

Difficulty: Easy
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.

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Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

25. Deming believed that only employees are responsible for improving quality.

Answer: False

Difficulty: Easy
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

26. The Deming Wheel is also known as the plan-do-check-act (PDCA) cycle.

Answer: True

Difficulty: Easy
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

27. Total quality management represents a set of management principles that focus on quality improvement in all the functional areas within a company.

Answer: True

Difficulty: Easy
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Knowledge
AACSB: Reflective Thinking

28. Statistical process control monitors and controls quality for both qualitative and quantitative variables.

Answer: True

Difficulty: Hard
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Comprehension
AACSB: Reflective Thinking

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29. Today total quality management has been displaced by quality management systems.

Answer: True

Difficulty: Hard
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Comprehension
AACSB: Reflective Thinking

30. Six Sigma is one of several well known quality management systems.

Answer: True

Difficulty: Easy
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Knowledge
AACSB: Reflective Thinking

31. The training and education of all employees on quality improvement is a basic principle of total quality management.

Answer: True

Difficulty: Easy
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Knowledge
AACSB: Reflective Thinking

32. One principle of total quality management (TQM) is that middle management is solely responsible for providing the leadership for quality.

Answer: False

Difficulty: Medium
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Comprehension
AACSB: Reflective Thinking

33. Employees' role in quality management is becoming less important because of the implementation of strong quality management systems.

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Answer: False

Difficulty: Medium
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Comprehension
AACSB: Reflective Thinking

34. Two team approaches to improvement are quality circles and process improvement teams.

Answer: True

Difficulty: Medium
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Comprehension
AACSB: Reflective Thinking

35. Six Sigma quality is a statistical measure that equates to only 3.4 defects per million.

Answer: True

Difficulty: Medium
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

36. Before Six Sigma, quality levels in North America were generally measured in defects per hundred.

Answer: True

Difficulty: Medium
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

37. Six Sigma is a recognized quality program based strictly on statistical process control.

Answer: False

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Difficulty: Easy
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

38. Companies that have adopted Six Sigma view it as a short-term strategy for quality improvement.

Answer: False

Difficulty: Easy
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

39. The fundamental objective of Six Sigma is to focus on improvement by reducing process variation.

Answer: True

Difficulty: Medium
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

40. With Six Sigma, the project team leader is known as a Black Belt.

Answer: True

Difficulty: Easy
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

41. With Six Sigma, a teacher and mentor is known as a Green Belt.

Answer: False

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Difficulty: Medium
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

42. The cost of measuring, testing, and analyzing are collectively known as appraisal costs.

Answer: True

Difficulty Easy
Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality
Blooms: Knowledge
AACSB: Reflective Thinking

43. Customer complaint costs are an example of external failure costs.

Answer: True

Difficulty: Medium
Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality
Blooms: Comprehension
AACSB: Reflective Thinking

44. ISO 9000 certification is a major consideration for doing business within North America.

Answer: False

Difficulty: Medium
Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality
Blooms: Comprehension
AACSB: Reflective Thinking

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MULTIPLE CHOICE QUESTIONS

45. Which of the following is *not* a dimension of quality for a manufactured good?
a) performance
b) reliability
c) courtesy
d) durability

Answer: c

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

46. The probability that a product will operate properly within an expected time frame is the dimension of quality known as
a) durability.
b) reliability.
c) performance.
d) serviceability.

Answer: b

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

47. The degree to which a product meets pre-established standards is known as
a) conformance.
b) performance.
c) reliability.
d) none of the above.

Answer: a

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

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48. Making sure that the product meets the design specifications during production is referred to as
a) quality of design.
b) process capability.
c) fitness for use.
d) quality of conformance.

Answer: d

Difficulty: Easy
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

49. A relationship between a firm and its supplier where the supplier agrees to meet the firms' quality standards and the firm enters into a long-term purchasing agreement with the supplier is known as
a) outsourcing.
b) vertical integration.
c) partnering.
d) conformance.

Answer: c

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Knowledge
AACSB: Reflective Thinking

50. All of the following are dimensions of quality for manufactured products, *except*
a) conformance.
b) reliability.
c) durability.
d) feasibility.

Answer: d

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension
AACSB: Reflective Thinking

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51. All of the following are dimensions of quality for services, *except*
a) courtesy.
b) servicability.
c) consistency.
d) responsiveness.

Answer: b

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension
AACSB: Reflective Thinking

52. ___ advocated continuous improvement to the production process to achieve conformance to specifications and reduce variability.
a) W. Edwards Deming
b) Philip Crosby
c) Kaoru Ishikawa
d) Frederick Taylor

Answer: a

Difficulty: Medium
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

53. W. Edwards Deming believed that primary responsibility for quality improvement rested with
a) the firm's employees only.
b) the form's management only.
c) research engineers and consulting statisticians only.
d) both the employees and management of the firm.

Answer: d

Difficulty: Medium
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Comprehension
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54. W. Edwards Deming's overall philosophy for achieving quality is embodied in

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a) his 14 points.
b) his statement of purpose.
c) his use of statistical control.
d) none of the above.

Answer: a

Difficulty: Easy
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

55. ___ developed control charts for statistical quality control.
a) W. Edwards Deming
b) Philip Crosby
c) Kaoru Ishikawa
d) Walter Shewhart

Answer: d

Difficulty: Easy
Learning Objective: Discuss the evolution of quality management into a quality management system, including key figures and their contributions.
Section Reference: 2.2 Quality Management System
Blooms: Knowledge
AACSB: Reflective Thinking

56. Which of the following quality tools displays major causes of poor quality on a graph?
a) Process flow chart
b) Fishbone diagram
c) Histogram
d) Scatter diagram

Answer: b

Difficulty: Medium
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Knowledge
AACSB: Reflective Thinking

57. Which of the following quality tools displays the frequency of data related to a quality problem?
a) Fishbone diagram
b) Histogram
c) Scatter diagram

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d) Process flow chart

Answer: b

Difficulty: Medium
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Knowledge
AACSB: Reflective Thinking

58. Which of the following quality tools displays the relationship between two variables on a graph?
a) Process flow chart
b) Fishbone diagram
c) Histogram
d) Scatter diagram

Answer: d

Difficulty: Medium
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Knowledge
AACSB: Reflective Thinking

59. Which of the following quality tools displays the steps in a process on a graph?
a) Process flow chart
b) Fishbone diagram
c) Histogram
d) Scatter diagram

Answer: a

Difficulty: Medium
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Knowledge
AACSB: Reflective Thinking

60. Which of the following statements about the voice of the customer is not correct?
a) The vast majority of consumers trusts peer recommendations, but only a small minority trusts advertisements.
b) Customers who “like” Walmart on Facebook are four times more likely to buy there than the average person.
c) On average, satisfied customers will tell more people on social media about their experiences than an unsatisfied customer will tell.
d) Over four out of five of consumers consult online reviews prior to their holiday purchases.

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Answer: c

Difficulty: Medium
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Knowledge
AACSB: Reflective Thinking

61. Directly involving employees in the quality-management process is referred to as
a) partnering.
b) a quality circle.
c) Six Sigma.
d) participative problem solving.

Answer: d

Difficulty: Easy
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Knowledge
AACSB: Reflective Thinking

62. Kaizen stands for
a) fitness for use.
b) quality of design.
c) Six Sigma.
d) continuous improvement.

Answer: d

Difficulty: Easy
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Knowledge
AACSB: Reflective Thinking

63. All of the following are parts of DMAIC, *except*
a) Define.
b) Measure.
c) Analyze.
d) Improvise.

Answer: d

Difficulty: Medium
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems

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and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Comprehension
AACSB: Reflective Thinking

64. All of the following are part of DMAIC *except*
a) Improve.
b) Control.
c) Measure.
d) Implement.

Answer: d

Difficulty: Medium
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Comprehension
AACSB: Reflective Thinking

65. Which quality guru stated that “Quality is not only free, it is an honest-to-everything profi t maker.”?
a) W. Edwards Deming
b) Philip Crosby
c) Kaoru Ishikawa
d) Frederick Taylor

Answer: b

Difficulty: Easy
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Knowledge
AACSB: Reflective Thinking

66. The costs associated with developing a quality management system are known as
a) training costs.
b) design costs.
c) quality planning costs.
d) information costs.

Answer: c

Difficulty: Medium
Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality

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Blooms: Knowledge
AACSB: Reflective Thinking

67, ___ failure costs include scrap, rework, and downtime.
a) External
b) Internal
c) Process
d) System

Answer: b

Difficulty: Medium
Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality
Blooms: Knowledge
AACSB: Reflective Thinking

68. A production process consists of the following four stages with the average percentage of good quality at each stage as shown:

Stage	Average Percentage of Good Quality
1	0.92
2	0.95
3	0.96
4	0.93

What is the daily production yield for the company if daily input is 200 units?
a) 192 units
b) 188 units
c) 184 units
d) 156 units

Answer: d

Difficulty: Hard
Learning Objective: Use several quality measures that reflect productivity.
Section Reference: 2.7 The Effect of Quality Management on Productivity
Blooms: Analysis
AACSB: Reflective Thinking

69. A production process consists of the following four stages with the average percentage of good quality at each stage as shown:

Stage	Average Percentage of Good Quality

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1	0.92
2	0.95
3	0.96
4	0.93

How many units must the company put into production each day to achieve a daily yield of 100 good units?
a) approximately 128 units
b) approximately 108 units
c) approximately 106 units
d) approximately 104 units

Answer: a

Difficulty: Hard
Learning Objective: Use several quality measures that reflect productivity.
Section Reference: 2.7 The Effect of Quality Management on Productivity
Blooms: Analysis
AACSB: Reflective Thinking

70. A production process consists of the following four stages with the average percentage of good quality at each stage as shown:

Stage	Average Percentage of Good Quality
1	0.95
2	0.95
3	0.93
4	0.97

What is the daily production yield for the company if daily input is 500 units?
a) 485 units
b) 465 units
c) 407 units
d) 400 units

Answer: c

Difficulty: Hard
Learning Objective: Use several quality measures that reflect productivity.
Section Reference: 2.7 The Effect of Quality Management on Productivity
Blooms: Analysis
AACSB: Reflective Thinking

71. A production process consists of the following four stages with the average percentage of good quality at each stage as shown:

Stage	Average Percentage

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	of Good Quality
1	0.95
2	0.95
3	0.93
4	0.97

How many units must the company put into production each day to achieve a daily yield of 350 good units?
a) approximately 430 units
b) approximately 415 units
c) approximately 468 units
d) approximately 361 units

Answer: a

Difficulty: Hard
Learning Objective: Use several quality measures that reflect productivity.
Section Reference: 2.7 The Effect of Quality Management on Productivity
Blooms: Analysis
AACSB: Reflective Thinking

72. Appraisal costs include the following except
a) inspection and testing costs.
b) test equipment costs..
c) training costs.
d) operator costs.

Answer: c

Difficulty: Medium
Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality
Blooms: Knowledge
AACSB: Reflective Thinking

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SHORT-ANSWER ESSAY QUESTIONS

73. Briefly discuss four dimensions of quality a consumer looks for in manufactured products.

Answer: Student answers will vary depending of the dimensions they select. Among the dimensions that could be discussed are:
Performance: the basic operating characteristics of a product.
Features: the extra items added to the basic features.
Reliability: the probability that a product will operate properly within an expected time frame.
Conformance: the degree to which a product meets pre-established standards.
Durability: how long the product lasts before it must be replaced.
Serviceability: the ease, speed, and facility of the repair process.
Aesthetics: how the product looks, feels, smells, sounds, or tastes.
Safety: assurance that the customer will not suffer injury or harm from a product.
Other: subjective perceptions based on brand name, advertising, etc.

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension
AACSB: Reflective Thinking

74. What is quality of conformance from the producer's perspective and how can it be achieved?

Answer: Once the product design has been determined, the producer perceives quality to be how effectively the production process is able to conform to the specifications required by the design. This is referred to as quality of conformance. What this means is quality during production focuses on making sure that the product meets the specifications required by the design. From the producer's perspective, good-quality products conform to specifications—they are well made. Achieving quality of conformance depends on a number of factors, including the design of the production process (distinct from product design), the performance level of machinery, equipment and technology, the materials used, the training and supervision of employees and the degree to which statistical quality-control techniques are used.

Difficulty: Medium
Learning Objective: Discuss the meaning of quality of goods and services from both the producer's and consumer's perspectives.
Section Reference: 2.1 What Is Quality?
Blooms: Comprehension
AACSB: Reflective Thinking

75. Briefly discuss the principles associated with total quality management (TQM).

Answer: Total quality management represents a set of management principles that focus on

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quality improvement as the driving force in all functional areas and at all levels in a company. These principles are:
the customer defines quality and customer satisfaction is the top priority,
top management must provide the leadership for quality,
quality is a strategic issue and requires a strategic plan,
quality is the responsibility of all employees in the organization,
all functions of the company must focus on continuous quality improvement to achieve strategic goals,
quality problems are solved through cooperation among employees and management,
problem solving and continuous quality improvement use statistical quality control methods, and training and education of all employees are the basis for continuous quality improvement.

Difficulty: Medium
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Comprehension
AACSB: Reflective Thinking

76. Briefly discuss partnering.

Answer: Many companies reduce their number of suppliers to have more direct influence over their suppliers' quality and delivery performance, which is one of Deming's 14 points. This decision is based on the notion that if a company has a major portion of a supplier's business, then the supplier is more willing to meet the customer's quality standards. The company and supplier enter into a business relationship referred to as partnering, in which the supplier agrees to meet the company's quality standards. In return, the company enters into a long-term purchasing agreement with the supplier that includes a stable order and delivery schedule.

Difficulty: Medium
Learning Objective: Use several common quality-control tools.
Section Reference: 2.3 Quality Tools
Blooms: Comprehension
AACSB: Reflective Thinking

77. Briefly describe quality circles.

Answer: One of the first team-based approaches to quality improvement was quality circles. Called quality-control circles in Japan where they originated during the 1960s, they were introduced to the United States in the 1970s. A quality circle is a small, voluntary group of employees and their supervisor(s), comprising a team of about eight to 10 members from the same work area or department. The supervisor is typically the circle moderator, promoting group discussion but not directing the group or making decisions; decisions result from group consensus. A circle meets about once a week, during company time, in a room designated especially for that purpose. The team works on problems and projects of their own choice. These problems may not always relate to quality issues; instead, they may focus on productivity, costs, safety, or other work-related issues in the circle members' area. Quality circles follow an established procedure for identifying, analyzing, and solving quality-related (or other) problems.

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Difficulty: Medium
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Comprehension
AACSB: Reflective Thinking

78. What is Kaizen and what role do employees play in Kaizen?

Answer: Kaizen is the Japanese word for continuous improvement, not only in the workplace but also in one's personal life. In the workplace Kaizen means involving everyone in a process of gradual, organized, and continuous improvement. Every employee in the organization should be involved in working together to make improvements. If an improvement is not a part of a continuous, ongoing process it is not considered Kaizen. Employees are most directly involved in Kaizen when they are determining solutions to their own problems. Employees are the real experts in their immediate workspace. In its most basic form Kaizen is a system in which employees identify many small improvements on a continual basis and implement these improvements themselves. Every employee is encouraged to be involved in the improvement process so that all employees feel that they are participating in quality improvements and remain excited about their jobs. All Six Sigma and TQM programs need this level of involvement to be successful.

Difficulty: Medium
Learning Objective: Describe several approaches used for involving employees in the quality-improvement process.
Section Reference: 2.4 The Role of Employees in Quality Improvement
Blooms: Comprehension
AACSB: Reflective Thinking

79. What is a Six Sigma quality program?

Answer: A Six Sigma program is fundamentally a very organized and detailed process for improving quality. There is little doubt that Six Sigma is a direct descendant of the philosophy and principles of TQM. In its simplest form Six Sigma is based on Deming's PDCA cycle and Juran's assertion that "all quality improvement occurs on a project-by-project basis." Six Sigma is a process for developing and delivering near perfect products and services. The main idea is that if the number of defects in a process can be measured then it can be systematically determined how to eliminate them and get as close to zero defects as possible. In Six Sigma "as close to zero as possible" translates into a statistically-based numerical goal of 3.4 defects per million opportunities (DPMO), which means defects have been nearly eliminated. Through the reduction of variation of all processes, the overall performance of the company will be improved and significant cost savings will be realized.

Difficulty: Medium
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.5 Six Sigma
Blooms: Comprehension
AACSB: Reflective Thinking

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80. Briefly describe various Six Sigma tools and give an example of the use of each.

Answer: QFD, Cause and Effect Matrix, FMEA, SPC, T-Tests, and DOE should all be discussed and related to quality management in particular, and as a critical part of contemporary operations and supply chain management.

Difficulty: Hard
Learning Objective: Use several common quality-control tools.
Learning Objective: Describe the Six Sigma and Lean Six Sigma quality management systems and calculate changes in profit resulting from Six Sigma projects.
Section Reference: 2.3 Quality Tools
Section Reference: 2.5 Six Sigma
Blooms: Comprehension
AACSB: Reflective Thinking

81. Briefly discuss the costs are associated with achieving good quality.

Answer: The costs of a quality management program are prevention costs and appraisal costs. Prevention costs are the costs of trying to prevent poor-quality products from reaching the customer. Prevention reflects the quality philosophy of “do it right the first time,” the goal of a quality management program. Examples of prevention costs include quality planning costs, product design costs, process costs, training costs, and information costs.
Appraisal costs are the costs of measuring, testing, and analyzing materials, parts, products, and the production process to ensure that product quality specifications are being met. Examples of appraisal costs include inspection and testing, test equipment costs, and operator costs.

Difficulty: Medium
Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality
Blooms: Comprehension
AACSB: Reflective Thinking

82. Briefly discuss the cost of poor quality.

Answer: Costs associated with poor quality are also referred to as the cost of nonconformance, or failure costs. The cost of poor quality can be categorized as internal failure costs or external failure costs. Internal failure costs are incurred when poor-quality products are discovered before they are delivered to the customer. Examples of internal failure costs include scrap costs, rework costs, process failure costs, process downtime costs, price-downgrading costs. External failure costs are incurred after the customer has received a poor-quality product and are primarily related to customer service. Examples of external failure costs include customer complaint costs, product return costs, warranty claims costs, product liability costs, and lost sales costs.

Difficulty: Medium

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Learning Objective: Classify quality-related costs and calculate and interpret quality-measurement indices.
Section Reference: 2.6 The Cost of Quality
Blooms: Comprehension
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