Test Bank Operations Management: An Integrated Approach, 6th Edition Reid Sanders


Chapter: Chapter 3 Test Bank: Product Design and Process Selection

Multiple Choice

1. The ease with which the product can be made is its
a) manufacturability
b) repeatability
c) readiness for manufacturing
d) reliability
e) accountability

Ans: a
Reference: Product Design
Level: Easy
Bloom’s: Knowledge
Learning Objective 1: Define product design and explain its strategic impact on the organization.
AACSB: Analytic

2. Service design differs from product design by including _____________ .
a) customer needs
b) marketing personnel in the decision making process
c) speed
d) quality
e) the esthetic and psychological benefits of the product

Ans: e
Reference: Product Design
Level: Easy
Bloom’s: Knowledge
Learning Objective 1: Define product design and explain its strategic impact on the organization.
AACSB: Analytic

3. A company’s product design supports its business strategies by
a) designing products that appeal to its customers
b) designing as many products as possible
c) including the company’s mission somewhere in the product
d) designing products that aid strategic planning activities
e) designing the company’s strategy
Ans: a
Reference: Product Design
Level: Easy
Bloom’s: Comprehension
Learning Objective 1: Define product design and explain its strategic impact on the organization.
AACSB: Analytic

4. Which of the following is not a step in product design?
a) final design
b) preliminary design and testing
c) idea development
d) conceptual design
e) product screening

Ans: d
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

5. __________ is a vital link between customers and product design.
a) Engineering
b) Accounting
c) The Internet
d) Operations
e) Marketing

Ans: e
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

6. All product designs begin with ____________.
a) a blueprint
b) a cost analysis
c) an idea
d) a feasibility study
e) a focus group

Ans: c
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
7. Which of the following is true regarding the relative predictability of the cycle of new product introductions?
   a) new car models are predictable, but new fashion and new skin care products are not
   b) new car models and new fashion are predictable, but new skin care products are not
   c) new car models, new fashion, and new skin care products are all predictable
   d) new car models, new fashion, and new skin care products are all unpredictable
   e) new fashion and new skin care products are predictable, but new car models are not

   Ans: b

   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Comprehension
   Learning Objective 2: Describe the steps used to develop a product design.
   AACSB: Analytic

8. Lands’ End is a well-known benchmarking target because of its __________.
   a) catalog business
   b) supply chain management
   c) success at resolving complaints
   d) labor relations
   e) environmental policies

   Ans: a

   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 2: Describe the steps used to develop a product design.
   AACSB: Analytic

9. In 1997, who performed a large benchmarking study for IBM?
   a) Boston Consulting Group
   b) Anderson Consulting
   c) i2 Technologies
   d) Mercer Management Consultants
   e) Manugistics

   Ans: d

   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 2: Describe the steps used to develop a product design.
   AACSB: Analytic

10. When designing the Taurus model, what did Ford Motor Company do with regard to BMW and Toyota?
a) benchmarking  
b) hired some of their employees  
c) reverse engineering  
d) copied their quality management techniques  
e) bought some of their dealerships

Ans: c  
Reference: The Product Design Process  
Level: Easy  
Bloom’s: Comprehension  
Learning Objective 2: Describe the steps used to develop a product design.  
AACSB: Analytic

11. Reverse engineering is:
   a) altering the basic design based on user input.  
b) reengineering a failing product.  
c) acquiring a competitor’s product and relabeling it for sale.  
d) acquiring a competitor’s product and studying its design features.  
e) changing your mind on the previous design.

Ans: d  
Reference: The Product Design Process  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 2: Describe the steps used to develop a product design.  
AACSB: Analytic

12. Studying the practices of companies considered “best in class” and comparing the performance of our company against their performance is
   a) competition  
b) copying  
c) frustration  
d) benchmarking  
e) notching

Ans: d  
Reference: The Product Design Process  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 2: Describe the steps used to develop a product design.  
AACSB: Analytic

13. Involving suppliers early in the design process is called:
   a) reengineering  
b) disaggregation  
c) redesign  
d) benchmarking  
e) supplier involvement

Ans: e
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

14. Evaluating a product idea to determine its likelihood of success is
   a) product screening
   b) estimating
   c) technological forecasting
   d) product windowing
   e) product evolution

Ans: a
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

15. In product screening, issues such as “Will we need new facilities and equipment?” and “Can material for production be readily obtained?” are addressed by
   a) marketing
   b) finance
   c) engineering
   d) operations
   e) accounting

Ans: d
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

16. In product screening, issues such as, “What is the market size?” and “What is the long term-product potential?” are addressed by:
   a) marketing
   b) finance
   c) engineering
   d) operations
   e) accounting

Ans: a
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

17. Approximately what percentage of ideas do not make it past the screening stage?
   a) 30%
   b) 50%
   c) 60%
   d) 80%
   e) 90%

   Ans: d
   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

18. What technique is based on computing the quantity of goods a company needs to sell to just cover its costs?
   a) net present value
   b) break-even analysis
   c) internal rate of return
   d) activity based costing
   e) variable costing

   Ans: b
   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Knowledge
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Analytic

19. Costs that are proportional to the amount of units produced, such as materials and labor, are
   a) fixed costs
   b) marginal revenue
   c) sunk costs
   d) cost drivers
   e) variable costs

   Ans: e
   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic
20. Which of the following is not a fixed cost?
a) land rent  
b) materials  
c) overhead  
d) taxes  
e) insurance  

Ans: b  
Reference: The Product Design Process  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 2: Describe the steps used to develop a product design.  
AACSB: Analytic

21. In break-even analysis, what is the break-even point?
a) the quantity where revenue equals total cost  
b) the quantity where revenue equals fixed cost  
c) the quantity where revenue equals variable cost  
d) the quantity beyond which the firm starts to lose money  
e) the quantity where variable cost equals fixed cost  

Ans: a  
Reference: The Product Design Process  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.  
AACSB: Analytic

22. In break-even analysis, in order to make a profit the company must
a) sell above the break-even point  
b) sell below the break-even point  
c) sell at a loss  
d) sell at the break-even point  
e) sell on consignment  

Ans: a  
Reference: The Product Design Process  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.  
AACSB: Analytic

23. For which of the following is break-even analysis not appropriate?
a) deciding how much of a product must be sold to make a profit  
b) evaluating different processes  
c) deciding whether it is better to make or buy a product  
d) deciding between different products  
e) deciding how to allocate overhead  

Ans: e  
Reference: The Product Design Process  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.  
AACSB: Analytic
Ans: e
Reference: The Product Design Process
Level: Easy
Bloom’s: Comprehension
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Analytic

24. Which of the following is not included in the preliminary design and testing stage?
   a) the product design idea is evaluated according to the needs of the major business functions
   b) design engineers translate general performance specifications into technical specifications
   c) “bugs” are worked out
   d) revising the design based on test results
   e) prototypes are built and tested

   Ans: a
   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Comprehension
   Learning Objective 2: Describe the steps used to develop a product design.
   AACSB: Analytic

25. During the final design and testing stage:
   a) the product design idea is evaluated according to the needs of the major business functions.
   b) design engineers hand the product over to the final design engineers.
   c) the product specifications are drawn up.
   d) marketing becomes involved for the first time.
   e) the product achieves full production.

   Ans: c
   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Comprehension
   Learning Objective 2: Describe the steps used to develop a product design.
   AACSB: Analytic

26. Which one of these refers to reducing the number of parts and features of the product whenever possible?
   a) design automation
   b) design specification
   c) design reduction
   d) design standardization
   e) design simplification

   Ans: e
   Reference: Factors Impacting Product Design
   Level: Easy
   Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

27. What refers to the use of common and interchangeable parts?
   a) design automation
   b) design specification
   c) design reduction
   d) design standardization
   e) design simplification

   Ans: d
   Reference: Factors Impacting Product Design
   Level: Easy
   Bloom’s: Knowledge

28. Which of the following is not a guideline for design for manufacture?
   a) use modular design
   b) design parts for different products
   c) minimize parts
   d) rely on automated equipment
   e) simplify operations

   Ans: d
   Reference: Factors Impacting Product Design
   Level: Easy
   Bloom’s: Comprehension

29. Maturity and decline are also referred to as:
   a) the early stages
   b) the life cycle
   c) the later stages
   d) design for manufacture stages
   e) re-engineering stages

   Ans: c
   Reference: The Product Design Process
   Level: Easy
   Bloom’s: Knowledge

30. Which type of operation is used to produce many different products with varying process requirements in lower volumes?
a) intermittent
b) repetitive
c) continuous
d) downstream
e) gateway

Ans: a
Reference: Process Selection
Level: Easy
Bloom’s: Knowledge
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Analytic

31. Which of the following is not characteristic of intermittent operations?
a) produce many different products with varying processing requirements
b) capital intensive
c) workers need to be able to perform different tasks depending on the processing needs of the product
d) general purpose equipment
e) volume of goods produced directly tied to number of customer orders

Ans: b
Reference: Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Analytic

32. Building a bridge over the Mississippi River for a new highway uses a
a) project process
b) batch process
c) line process
d) continuous process
e) recycle process

Ans: a
Reference: Process Selection
Level: Medium
Bloom’s: Application
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Reflective Thinking

33. The classes that you are taking at the university use a __________ process.
a) project
b) batch
c) line
d) continuous
e) recycle
Ans: b
Reference: Process Selection
Level: Medium
Bloom’s: Application
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Reflective Thinking

34. What type of process is designed to produce a large volume of a standardized product for mass production, such as automobiles?
a) project processes  
b) batch processes  
c) line processes  
d) continuous processes  
e) recycle processes

Ans: c
Reference: Process Selection
Level: Easy
Bloom’s: Knowledge
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Analytic

35. Which type of process would be least likely to produce goods for inventory rather than for a specific customer request?
a) project  
b) batch  
c) line  
d) continuous  
e) remanufacturing

Ans: a
Reference: Process Selection
Level: Hard
Bloom’s: Evaluation
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Reflective Thinking

36. Which of the following is a tool for evaluating an operation in terms of the sequence of steps from inputs to outputs with the goal of improving its design?
a) operations analysis  
b) operations sequencing  
c) process flow analysis  
d) input/output analysis  
e) sequencing analysis

Ans: c
Reference: Designing Processes
Level: Easy
37. If the third stage of a repetitive line process cannot complete its activities as fast as stage one or two it has become a:
a) key work location
b) bottle neck
c) place not to work
d) project process location
e) none of these

Ans: b
Reference: Designing Processes
Level: Medium
Bloom’s: Analysis
Learning Objective 5: Understand how to use a process flowchart.
AACSB: Reflective Thinking

38. Which of the following is correct sequence for relating product design, process selection, and arrangement of equipment in the factory?
a) product design determines arrangement of equipment which determines process selection
b) product design determines process selection which determines arrangement of equipment
c) process selection determines product design which determines arrangement of equipment
d) process selection determines arrangement of equipment which determines product design
e) arrangement of equipment determines process selection which determines product design

Ans: b
Reference: Linking Product Design and Process Selection
Level: Hard
Bloom’s: Evaluation
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Reflective Thinking

39. What type of operations focus on products in the early stage of the life cycle?
a) repetitive
b) downstream
c) gateway
d) intermittent
e) recycle

Ans: d
Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Knowledge
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic
40. With respect to competitive priorities, intermittent operations compete more on ____________ compared to repetitive operations.
   a) cost and features
   b) durability and cost
   c) availability and reliability
   d) flexibility and delivery
   e) durability and features

   Ans: d
   Reference: Linking Product Design and Process Selection
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 7: Understand the link between product design and process selection.
   AACSB: Analytic

41. Intermittent operations group their resources based on
   a) requirements of the product
   b) similar operations or functions
   c) shape of the shop floor
   d) abilities of the labor force
   e) the number of machines

   Ans: b
   Reference: Linking Product Design and Process Selection
   Level: Easy
   Bloom’s: Comprehension
   Learning Objective 7: Understand the link between product design and process selection.
   AACSB: Analytic

42. Compared to intermittent operations, repetitive operations
   a) have higher material handling costs
   b) have greater efficiency
   c) have slower processing rates
   d) have more flexibility
   e) are less specialized

   Ans: b
   Reference: Linking Product Design and Process Selection
   Level: Medium
   Bloom’s: Analysis
   Learning Objective 7: Understand the link between product design and process selection.
   AACSB: Analytic

43. Which product and service strategy is used to produce standard components that can be combined to customer specifications?
   a) assemble-to-deliver
   b) make-to-stock
44. Which product and service strategy has the longest delivery lead time?
   a) assemble-to-deliver
   b) make-to-stock
   c) assemble-to-order
   d) make-to-order
   e) make-to-package
   Ans: d
   Reference: Linking Product Design and Process Selection
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 7: Understand the link between product design and process selection.
   AACSB: Analytic

45. Pre-fabricated furniture with choices of fabric colors is an example of which product and service strategy?
   a) assemble-to-deliver
   b) make-to-stock
   c) assemble-to-order
   d) make-to-order
   e) make-to-package
   Ans: c
   Reference: Linking Product Design and Process Selection
   Level: Medium
   Bloom’s: Application
   Learning Objective 7: Understand the link between product design and process selection.
   AACSB: Reflective Thinking

46. Which product and service strategy is typically seen in repetitive operations?
   a) assemble-to-deliver
   b) make-to-stock
   c) assemble-to-order
   d) make-to-order
   e) make-to-package
   Ans: b
47. If a firm’s facility layout is **not** correct it will create:
   a) project processes
   b) optimum outputs
   c) equal number of products
   d) inefficiency
   e) job satisfaction

   Ans: d

Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Knowledge
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic

48. Information Technology does **not** assist the firm in:
   a) information storage
   b) information processing
   c) information creation
   d) intra firm information communication
   e) inter firm information communication

   Ans: c

Reference: Technology Decisions
Level: Easy
Bloom's: Knowledge
Learning Objective 8: Understand current technological advancements and how they impact process and product design.
AACSB: Technology

49. Vertical integration is a good strategic option for a manufacturing company when
   a) it needs several different parts and subassemblies
   b) it makes many different products
   c) its facilities are obsolete
   d) it uses distributed processing
   e) it needs one input material in large volumes

   Ans: e

Reference: Linking Product Design and Process Selection
Level: Easy
Bloom's: Comprehension
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic
50. Which of the following is a disadvantage of automation?
   a) inflexibility for product and process changes
   b) inconsistency of products
   c) inefficiency for producing large volumes
   d) harder to monitor quality
   e) frequent interruptions of production

   Ans: a
   Reference: Technology Decisions
   Level: Easy
   Bloom’s: Comprehension
   Learning Objective 8: Understand current technological advancements and how they impact process and product design.
   AACSB: Technology

51. What is a small battery-driven truck that is not operated by a human and moves material from location to location?
   a) CAD
   b) AGV
   c) AS/RS
   d) FMS
   e) CAM

   Ans: b
   Reference: Technology Decisions
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 8: Understand current technological advancements and how they impact process and product design.
   AACSB: Technology

52. A technology which uses sensor tags to monitor perishable products is:
   a) FMS
   b) CAD
   c) RFID
   d) CAM
   e) RF

   Ans: c
   Reference: Technology Decisions
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 8: Understand current technological advancements and how they impact process and product design.
   AACSB: Technology
53. What is an automated material handling system that basically is an automated warehouse?
   a) CAD
   b) AGV
   c) AS/RS
   d) FMS
   e) CAM

   Ans: c
   Reference: Technology Decisions
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 8: Understand current technological advancements and how they impact process and product design.
   AACSB: Technology

54. What is CAD short for?
   a) conceptually appropriate design
   b) computer aided design
   c) commercial applications design
   d) competitive advantage design
   e) completely automated design

   Ans: b
   Reference: Technology Decisions
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 8: Understand current technological advancements and how they impact process and product design.
   AACSB: Technology

55. What is a type of automation system that provides the flexibility of intermittent operations with the efficiency of repetitive operations?
   a) CAD
   b) AGV
   c) AS/RS
   d) FMS
   e) CAM

   Ans: d
   Reference: Technology Decisions
   Level: Easy
   Bloom’s: Knowledge
   Learning Objective 8: Understand current technological advancements and how they impact process and product design.
   AACSB: Technology

56. In manufacturing, a robot typically:
   a) resembles a human in appearance
b) has a mechanical arm  
c) is mobile  
d) has legs  
e) is very small  

Ans: b  
Reference: Technology Decisions  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 8: Understand current technological advancements and how they impact process and product design.  
AACSB: Technology  

57. What type of machine is controlled by a computer and can do a variety of tasks, such as drilling, boring, or turning parts of different sizes and shapes?  
a) numerically controlled  
b) variable turning  
c) flexible driven  
d) non-calculating  
e) next component  

Ans: a  
Reference: Technology Decisions  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 8: Understand current technological advancements and how they impact process and product design.  
AACSB: Technology  

58. Which of the following is a printing technology in which materials like plastics and metals are deposited in thick layers one atop the other?  
a) Offset Printing  
b) Toner Printing  
c) 3D Printing  
d) Gravure printing  
e) 2D Printing  

Ans: c  
Reference: Technology Decisions  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 8: Understand current technological advancements and how they impact process and product design.  
AACSB: Technology  

59. Which of the following is true of intelligent assembly robots?  
a. They have consistent finger dexterity.  
b. They lack the precision to perform medical surgeries.  
c. They require large incisions.  
d. They cannot provide a competitive advantage.
e. They require huge, complex installations.

Ans: a
Reference: Technology Decisions
Level: Easy
Bloom’s: Comprehension
Learning Objective 8: Understand current technological advancements and how they impact process and product design.
AACSB: Technology

60. What term is used to describe the integration of product design, process planning, and manufacturing using an integrated computer system?
   a) CAD/CAM
   b) AGV
   c) AS/RS
   d) FMS
   e) CIM

Ans: e
Reference: Technology Decisions
Level: Easy
Bloom’s: Knowledge
Learning Objective 8: Understand current technological advancements and how they impact process and product design.
AACSB: Technology

61. Since services are intangible, the design of the service needs ____________ .
   a) to be intangible
   b) to be very specific
   c) to be in the mind of the customer
   d) to be explained to the customer prior to delivery of the service
   e) to specify exactly what the customer is supposed to experience.

Ans: e
Reference: Designing Services
Level: Easy
Bloom’s: Comprehension
Learning Objective 9: Understand issues of designing service operations.
AACSB: Analytic

62. Services with low customer contact are called ____________ .
   a) quasi-manufacturing
   b) quasi-services
   c) mixed services
   d) pure services
   e) mixed manufacturing

Ans: a
Reference: Designing Services
63. Highly labor intensive services are called ____________.
   a) quasi-manufacturing  
   b) quasi-services  
   c) mixed services  
   d) pure services  
   e) mixed manufacturing

   Ans: d

   Reference: Designing Services

64. Firms that have areas that have little customer contact and others with high customer contact are
classified as ___________ services.
   a) pure services  
   b) quasi-manufacturing  
   c) quasi-services  
   d) mixed services  
   e) manufacturing

   Ans: d

   Reference: Designing Services

65. What are the three elements of the service package?
   a) physical goods, sensual benefits, and psychological benefits  
   b) sales, return policy, and warranty  
   c) customer service, return policy, and warranty  
   d) kindness, information provision, and speed  
   e) physiological benefits, sensual benefits, and psychological benefits

   Ans: a

   Reference: Designing Services
66. What are the three different service designs that are described in the chapter?
a) substitute people for technology; get the customer involved, high customer attention approach  
b) customer-based market research, high customer attention approach, substitute technology for people  
c) customer-based market research, high customer attention approach, gets the customer involved  
d) substitute people for technology, customer-based market research, and high customer attention approach  
e) substitute technology for people; get the customer involved, high customer attention approach  

Ans: e

Reference: Designing Services  
Level: Easy  
Bloom’s: Knowledge  
Learning Objective 9: Understand issues of designing service operations.  
AACSB: Analytic

67. Product design decisions are:  
a) purely tactical decisions.  
b) mixed tactical and strategic decisions.  
c) strategic in nature.  
d) only made by the OM department.  
e) rarely made.  

Ans: c  
Reference: Product Design and Process Selection Within OM  
Level: Easy  
Bloom’s: Comprehension  
Learning Objective 7: Understand the link between product design and process selection.  
AACSB: Analytic

68. Company A has a great idea for a product. What is the first step for Company A?  
a) do a break-even analysis  
b) determine characteristics and features of the product  
c) determine the process selection  
d) determine characteristics and features of the product and determine the process selection  
e) benchmark other similar company’s products  

Ans: d (these are done in tandem; pg. 56)  
Reference: The Product Design Process  
Level: Medium  
Bloom’s: Application  
Learning Objective 2: Describe the steps used to develop a product design.  
AACSB: Reflective Thinking

69. The steps in the product design process include  
a) Idea Development, Product Screening, Break-even analysis, Build  
b) Idea Development, Benchmarking, Preliminary Design, Final Design  
c) Seek Competitors Design Specs, Product Screening, Manufacture, Sell
d) Seek Customer Input, Product Screening, Testing, Final Design

e) Idea Development, Product Screening, Preliminary Design & Testing, Final Design

Ans: e (pg. 57)
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Reflective Thinking

70. Which type of operational function represents an Assemble-to-Order?

a) wedding invitations
b) corporate training
c) airline flights
d) legal services
e) vacation packages

Ans: b
Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic

71. A series of stages that products pass through in their lifetime, characterized by changing product demands over time is defined as

a) Development life cycle
b) Design program
c) Product life cycle
d) Services life cycle
e) Product life methodology

Ans: c
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

72. Why is a process flowchart useful?

a) for designing a product
b) for determining where the strengths are in a process
c) for determining where the weaknesses are in a process
d) for seeing the totality of the operation and for identifying potential problem areas
e) for benchmarking against other processes

Ans: d
Reference: Designing Processes
73. Product design and process selection decisions are typically made separately.

Ans: False
Reference: Product Design
Level: Easy
Bloom’s: Comprehension
Learning Objective 1: Define product design and explain its strategic impact on the organization.
AACSB: Analytic

74. One source of new product ideas is a product manager.

Ans: True
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

75. To remain competitive, companies must be innovative and bring out new products regularly.

Ans: True
Reference: The Product Design Process
Level: Easy
Bloom’s: Comprehension
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

76. Analyzing customer preferences is an ongoing process.

Ans: True
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

77. There is a pure mathematical formula to making the decision to pursue a specific idea.

Ans: False
Reference: The Product Design Process
Level: Easy
Bloom’s: Comprehension
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

78. Benchmarking should only be performed against firms in similar lines of business with our own.

Ans: False
Reference: The Product Design Process
Level: Easy
Bloom’s: Comprehension
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

79. Buying a competitor’s new product and studying its design features by disassembling it and analyzing its parts and features is reverse engineering.

Ans: True
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

80. Net present value is based on computing the quantity of goods a company needs to sell to just cover its costs.

Ans: False
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

81. At the preliminary design and testing stage of new product design, design engineers translate technical specifications into general performance specifications.

Ans: False
Reference: The Product Design Process
Level: Easy
Bloom’s: Comprehension
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

82. Understanding the stages of the life cycle is not important for product design purposes.

Ans: False
Reference: Factors Impacting Product Design
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

83. Design standardization refers to the use of common and interchangeable parts.

Ans: True
Reference: Factors Impacting Product Design
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

84. One issue that design for manufacture focuses on is material durability.

Ans: False
Reference: Factors Impacting Product Design
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

85. When product and process design work together, much of the work is done in sequence rather than in parallel.

Ans: False
Reference: Factors Impacting Product Design
Level: Easy
Bloom’s: Comprehension
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

86. Remanufacturing is the concept of using components of old products in the production of new ones.

Ans: True
87. Repetitive operations are used to produce many different products with varying process requirements in lower volumes.

Ans: False
Reference: Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Analytic

88. A common difference between intermittent and repetitive operations is degree of product standardization.

Ans: True
Reference: Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Analytic

89. Intermittent operations group their resources based on similar operations or functions.

Ans: True
Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Knowledge
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic

90. The make-to-stock product and service strategy has the shortest delivery lead time among the possible strategies, but the customer has no involvement in product design.

Ans: True
Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic
91. Process velocity is computed as a ratio of throughput time to output.

Ans: False
Reference: Process Performance Metrics
Level: Easy
Bloom’s: Knowledge
Learning Objective 6: Understand how to use process performance metrics.
AACSB: Analytic

92. One advantage of robots is that they can perform delicately fine, small motor movements.

Ans: True
Reference: Technology Decisions
Level: Easy
Bloom’s: Knowledge
Learning Objective 8: Understand current technological advancements and how they impact process and product design.
AACSB: Analytic

93. Using 3D printing, a solid object can be created from a software design with just a click of a button.

Ans: True
Reference: Technology Decisions
Level: Easy
Bloom’s: Knowledge
Learning Objective 8: Understand current technological advancements and how they impact process and product design.
AACSB: Analytic

94. Outsourcing instead of pursuing vertical integration is often a good strategic option for a firm using an intermittent operation.

Ans: True
Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic

95. The psychological benefits of the service package involve the sights, smells, and sounds of the experience.

Ans: False
Reference: Designing Services
Level: Easy
Bloom’s: Comprehension
Learning Objective 9: Understand issues of designing service operations.
AACSB: Analytic
96. Triangle symbols are used in a process flowchart to represent decision points?

Ans: True
Reference: Designing Processes
Level: Easy
Bloom’s: Knowledge
Learning Objective 5: Understand how to use a process flowchart.
AACSB: Analytic

Essay

97. Define product design.

Ans: The process of deciding on the unique characteristics and features of the company’s products.
Reference: Product Design
Level: Easy
Bloom’s: Knowledge
Learning Objective 1: Define product design and explain its strategic impact on the organization.
AACSB: Analytic

98. Name some sources for ideas for new products.

Ans: customers, competitors, R&D departments, suppliers, employees, and new technological developments
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

99. In the product screening stage of new product development, what are some questions that may need to be explored by the operations function? By marketing? By finance?

Ans: Operations: What are the production needs of the proposed new product and how do they match our existing resources? Will we need new facilities and equipment? Do we have the labor skills to make the product? Can the materials for production be readily obtained? Marketing: What is the potential size of the market for the proposed new product? How much effort will be needed to develop a market for the product and what is the long-term product potential? Finance: What is the proposed new product’s financial potential, cost, and return on investment?
Reference: The Product Design Process
Level: Medium
Bloom’s: Analysis
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Reflective Thinking

100. Describe what process flow analysis is.
Ans: A technique used for evaluating a process in terms of the sequence of steps from inputs to outputs with the goal of improving its design.
Reference: Designing Processes
Level: Easy
Bloom's: Comprehension
Learning Objective 5: Understand how to use a process flowchart.
AACSB: Analytic

101. For what types of decisions is break-even analysis appropriate?
Ans: deciding how much of a product must be sold to make a profit, evaluating different processes, deciding whether it is better to make or buy a product, and deciding between different products
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Analytic

102. What is included in the preliminary design and testing stage of product design?
Ans: design engineers translate general performance specifications into technical specifications, “bugs” are worked out, revising the design based on test results, and prototypes are built and tested
Reference: The Product Design Process
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

103. What are the guidelines for design for manufacture?
Ans: Use modular design, design parts for different products, minimize parts, simplify operations, and avoid tools
Reference: Factors Impacting Product Design
Level: Easy
Bloom’s: Knowledge
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

104. What are the characteristics of intermittent operations?
Ans: Produce many different products with varying processing requirements, different products have different processing needs and there is no standard route that all products take through the facility, resources are grouped by function, labor intensive, often there are skilled and semiskilled workers with a fair amount of discretion in performing their jobs, workers need to be flexible and to be able to perform different tasks depending on the processing needs of the product, general purpose equipment, and the volume of goods produced is directly tied to the number of customer orders
105. What are the characteristics of repetitive operations?

Ans: Produce one or a few standardized products in high volumes, resources are organized in a line flow efficiently accommodate production of the product, capital intensive, often rely on automation and technology to improve efficiency and increase output, specialized equipment, and the volume of goods produced is based on a forecast of future demands.

Reference: Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 4: Identify different types of processes and explain their characteristics.
AACSB: Analytic

106. Describe three different types of service designs.

Ans: (1) substituting technology for people—this provides product consistency and takes the guesswork away from employees; (2) get the customer involved—this can speed delivery, reduce costs, and empower customers; (3) high customer attention approach—this customizes the service needs unique to each customer and has them be passive and pampered recipients of the service.

Reference: Designing Services
Level: Easy
Bloom’s: Comprehension
Learning Objective 9: Understand issues of designing service operations.
AACSB: Analytic

107. Describe why marketing should be involved in the product design process.

Ans: Marketing is impacted by product design issues because they determine the types of products that will be produced and affect marketing’s ability to sell them. Marketing understands the types of product characteristics customers want and can provide operations with information on customer preferences, competition, and future trends.

Reference: Product Design and Process Selection Within OM
Level: Easy
Bloom’s: Comprehension
Learning Objective 2: Describe the steps used to develop a product design.
AACSB: Analytic

108. What is the break-even volume given a fixed cost of $100,000, a variable cost per unit of $30, and a selling price of $35?

Ans: 20,000 units ($BE = F/(SP - VC) = $100,000/($35 - $30) = 20,000)
Reference: The Product Design Process
109. What is the break-even volume given a fixed cost of $15,000,000, a variable cost per unit of $2.30, and a selling price of $12.80?

Ans: 1,428,571 units  \( Q_{BE} = \frac{F}{SP - VC} = \frac{15,000,000}{12.80 - 2.30} = 1,428,571 \)

Reference: The Product Design Process
Level: Medium
Bloom's: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Reflective Thinking

110. What is the break-even volume given insurance costs of $30,000, materials costs of $6 per unit, taxes of $10,000, labor costs of $34 per unit, and a selling price of $80?

Ans: 1000 units  \( Q_{BE} = \frac{F}{SP - VC} = \frac{30,000 + 10,000}{80 - (34 + 6.00)} = 1,000 \)

Reference: The Product Design Process
Level: Medium
Bloom's: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Reflective Thinking

111. If a firm has fixed costs of $250,000, a market-based selling price of $50 per unit, and it expects to sell 20,000 units, how low must its variable costs be to break even?

Ans: $37.50  \( VC = SP - F/ Q_{BE} = 50 - 250,000/20,000 = 37.50/\text{unit} \)

Reference: The Product Design Process
Level: Medium
Bloom's: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Reflective Thinking

112. Blaster Radio Company is trying to decide whether or not to introduce a new model. If they introduce it, there will be additional fixed costs of $400,000 per year. The variable costs have been estimated to be $20 per radio.

a) If Blaster sells the new radio model for $30 per radio, how many must they sell to break even?

Ans: 40,000 radios  \( Q_{BE} = \frac{F}{SP - VC} = \frac{400,000}{30 - 20} = 40,000 \)

b) If Blaster sells 70,000 of the new radio model at the $30 price, what will the contribution to profit be?

Ans: $300,000  \( \text{Profit} = \text{total revenue} - \text{total cost} = SP*A - (F+VC*Q) = 30 * 70000 - (400,000 + (20*70000)) = 300,000 \)

Reference: The Product Design Process
Level: Medium
Bloom’s: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.  
AACSB: Reflective Thinking

113. Birdie Par owns a company that makes golf gloves. She is thinking about introducing a new glove, which would require an additional fixed cost of $20,000 per year. The variable costs for the new glove have been estimated to be $5 per glove.

a) If she sells the new glove for $15, how many must she sell to break even?

b) If she sells 3,000 gloves at the $15 price, what will the contribution to profit be?

Ans:  
a) \[ Q_{BE} = \frac{F}{SP - VC} = \frac{20,000}{15 - 5} = 2,000 \]  
b) \[ \text{Profit} = \text{total revenue} - \text{total cost} = SP*A - [F + VC*Q] = 15 * 3000 - [20,000 + (5*3000)] = 10,000 \]

Reference: The Product Design Process
Level: Medium
Bloom’s: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Reflective Thinking

114. Bazooka Company is thinking about introducing a new type of color printer. If they introduce it, their factory will incur additional fixed costs of $37,000,000 per year. The variable costs will be $261 per printer.

a) If Bazooka sells the new printer for $819, how many must they sell to break even?

b) If Bazooka sells 70,000 of the new printer at the $819 price, what will the contribution to profit be?

Ans:  
a) \[ Q_{BE} = \frac{F}{SP - VC} = \frac{37,000,000}{819 - 261} = 66,308 \]  
b) \[ \text{Profit} = \text{total revenue} - \text{total cost} = SP*A - [F + VC*Q] = 819 * 70,000 - [37,000,000 + (261*70,000)] = 2,060,000 \]

Reference: The Product Design Process
Level: Medium
Bloom’s: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Reflective Thinking

115. Sam Smear owns a manufacturing company that makes ball point pens. Currently he is trying to decide between two processes for making the pens. The first process will have a fixed cost of $200,000 per year and variable costs of $0.40 per pen. The second process will have a fixed cost of $250,000 per year and variable costs of $0.30 per pen.

a) Identify which ranges of product volume are best for each process.

b) If Sam makes 200,000 pens, which process provides a lower cost?

Ans:  
a) \[ Q = (F_2 - F_1)/(VC_2 - VC_1) = (250,000 - 200,000)/(0.40 - 0.30) = 500,000 \]  
b) the first process

Reference: Product Design and Process Selection Across the Organization
116. If a firm has fixed costs of $200,000, variable costs of $100 per unit, and it hopes to sell 1000 units, what selling price must it charge in order to break even?

Ans: $300 (SP = F/ Q\(_{BE}\) + VC = $200,000/1000 + $100 = $300)

Reference: Product Design and Process Selection Across the Organization
Level: Medium
Bloom’s: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Reflective Thinking

117. Languages, Inc. manufactures hand held computers that translate between two languages. Based on their market research, they have developed computers for French/English, German/English, and Spanish/English. The process for making the computers will have fixed costs of $2,000,000 per year and variable costs of $50 per computer. The company believes that it can sell at least 40,000 computers per year.

a) What should the price per computer be if the company wants to break even at a volume of 40,000 computers per year?

b) If they sell 60,000 computers at a price of $90 per computer, what will the contribution to profit be?

Ans: a) $100 (SP = F/ Q\(_{BE}\) + VC = $2,000,000/40000 + $50 = $100)
b) $400,000 (Profit = total revenue - total cost = SP*A - [F+VC*Q] = $90 * 60,000 - [2,000,000 + ($50*60,000)] = $400,000)

Reference: Product Design and Process Selection Across the Organization
Level: Medium
Bloom’s: Application
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Reflective Thinking

118. Frank’s manufacturing firm has determined that the industry standard process velocity time is 15 seconds. Frank’s OM engineer has determined that their process velocity time is 17 seconds with a throughput time of 136 seconds. If the throughput time cannot be changed, what, how much, and by which direction does the value added time need to change so Frank’s manufacturing can match the industry standard process velocity?

Ans: Process Velocity = Throughput time/value added time; Value added time = Throughput time/process velocity

Value added time = 136/17 = 8; 14.5=136/value added time: Value added time = 136/15 = 9.1

Value added time must increase by 1.1 seconds

Reference: Process Performance Metrics
Level: Medium
Bloom’s: Analysis
Learning Objective 6: Understand how to use process performance metrics.
119. Tom’s hazardous material movement company limits the number of hours an individual works to 8.5 a day. Each hazardous material handler product movement time has been stopwatch analyzed to take 240 seconds. What is the hazardous material handler utilization if they make 110 moves a day?

Ans: Utilization = time a resource used/time a resource available
Convert hours available to seconds available: 8.5 hrs/day* 60 minutes/hr*60 seconds/minute = 30600 seconds/day
Utilization = (110*240) sec/30600 sec = 0.863 (86.3%)

Reference: Process Performance Metrics
Level: Medium
Bloom’s: Application
Learning Objective 6: Understand how to use process performance metrics.
AACSB: Reflective Thinking

120. Name a company that hurt its business success by changing its Operations Type.

Ans: Babcock & Wilcox is one example.
Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Knowledge
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic

121. What is throughput time if process velocity = 5 and Value-added time = 2?

Ans: Process velocity = Throughput time/Value-added time, so Throughput time = Process velocity * Value-added time = 2 * 5 = 10.
Reference: Process Performance Metrics
Level: Medium
Bloom’s: Application
Learning Objective 6: Understand how to use process performance metrics.
AACSB: Reflective Thinking

122. What is input if Productivity = 7 and Output = 5?

Ans: Productivity = Output / Input, so Input = Output/Productivity = 5/7 = 0.71.
Reference: Process Performance Metrics
Level: Medium
Bloom’s: Application
Learning Objective 6: Understand how to use process performance metrics.
AACSB: Reflective Thinking
123. How efficient was a process whose Standard output = 27 while Actual output = 24?

Ans: Efficiency = Actual output / Standard output = 24 / 27 0.889.
Reference: Process Performance Metrics
Level: Medium
Bloom’s: Application
Learning Objective 6: Understand how to use process performance metrics.
AACSB: Reflective Thinking

124. Why is delivery time longer for make to order than assembly to order processes that deliver similar products?

Ans: Processing time is part of delivery time for a make to order process but not for an assemble to order process.
Reference: Linking Product Design and Process Selection
Level: Easy
Bloom’s: Comprehension
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic

125. Name a reason for using ERP and a reason it might be difficult to implement.

Ans: Successful ERP projects improve coordination among an organization's resources while requiring substantial changes in workers' sense of control over their data and relationships with other departments.
Reference: Technology Decisions
Level: Easy
Bloom’s: Comprehension
Learning Objective 8: Understand current technological advancements and how they impact process and product design.
AACSB: Analytic

126. Name three computer applications that affect product design and process selection:

Reference: Technology Decisions
Level: Easy
Bloom’s: Knowledge
Learning Objective 8: Understand current technological advancements and how they impact process and product design.
AACSB: Technology

127. What is the break-even price if fixed cost = 100, variable cost = 7, and selling price = 9?

Ans: 50. The break-even quantity formula, (formula), assumes that the selling price will be constant as quantity supplied increases. If true, the break-even price is 9, otherwise, it cannot be determined with this data.
128. Substituting technology for people has been argued to reduce what in the service delivery?

Ans: uncertainty of service delivery
Reference: Designing Services
Level: Easy
Bloom’s: Remember
Learning Objective 3: Use break-even analysis as a tool in deciding between alternative products.
AACSB: Analytic

129. Why are services more complex to design than manufactured goods?

Ans: Services produce intangible products produced with high levels of customer contact.
Reference: Product Design and Process Selection Across the Organization
Level: Easy
Bloom’s: Comprehension
Learning Objective 9: Understand issues of designing service operations.
AACSB: Analytic

130. Name an operational consideration that a firm must take into consideration when designing a new product.

Ans: Type of processes already used in the company.
Reference: Product Design and Process Selection Within OM: How it all Fits Together
Level: Easy
Bloom’s: Knowledge
Learning Objective 7: Understand the link between product design and process selection.
AACSB: Analytic

131. What is a process flowchart?

Ans: A chart showing the sequence of steps in producing the product or service.
Reference: Designing Processes
Level: Easy
Bloom’s: Knowledge
Learning Objective 5: Understand how to use a process flowchart.
AACSB: Analytic

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