

Chapter 17--Inventory and Production Management

LEARNING OBJECTIVES

| | |
|------|--|
| LO 1 | What are the most important relationships in the value chain? |
| LO 2 | Why is management of inventory costs important to most firms? |
| LO 3 | How do push and pull systems of production control work? |
| LO 4 | Why do product life cycles affect profitability? |
| LO 5 | What is target costing, and how does it influence production cost management? |
| LO 6 | What is the just-in-time philosophy? What modifications does JIT require in accounting systems? |
| LO 7 | What are flexible manufacturing systems? |
| LO 8 | How can the theory of constraints help in determining production flow? |
| LO 9 | (Appendix) How are economic order quantity, reorder point, and safety stock determined and used? |

QUESTION GRID

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

Completion

| | Difficulty Level | | | Learning Objectives | | | | | | | | |
|----|------------------|----------|-----------|---------------------|------|------|------|------|------|------|------|------|
| | Easy | Moderate | Difficult | LO 1 | LO 2 | LO 3 | LO 4 | LO 5 | LO 6 | LO 7 | LO 8 | LO 9 |
| 1 | x | | | x | | | | | | | | |
| 2 | x | | | | x | | | | | | | |
| 3 | x | | | | | x | | | | | | |
| 4 | x | | | | | x | | | | | | |
| 5 | x | | | | | | | x | | | | |
| 6 | x | | | | | | | x | | | | |
| 7 | | x | | | | | | x | | | | |
| 8 | | x | | | | | | x | | | | |
| 9 | | x | | | | | | | x | | | |
| 10 | | x | | | | | | | | x | | |
| 11 | x | | | | | | | | | | x | |
| 12 | | x | | | | | | | | | | x |

Multiple Choice

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

| | Difficulty Level | | | Learning Objectives | | | | | | | | |
|-----|------------------|----------|-----------|---------------------|------|------|------|------|------|------|------|------|
| | Easy | Moderate | Difficult | LO 1 | LO 2 | LO 3 | LO 4 | LO 5 | LO 6 | LO 7 | LO 8 | LO 9 |
| 43 | x | | | | | | | x | | | | |
| 44 | x | | | | | | x | | | | | |
| 45 | x | | | | | | x | | | | | |
| 46 | x | | | | | | x | | | | | |
| 47 | x | | | | | | x | | | | | |
| 48 | x | | | | | | | x | | | | |
| 49 | x | | | | | | | x | | | | |
| 50 | x | | | | | | | x | | | | |
| 51 | x | | | | | | | x | | | | |
| 52 | x | | | | | | | x | | | | |
| 53 | x | | | | | | | x | | | | |
| 54 | x | | | | | | | | | | x | |
| 55 | | x | | | | | | | | | x | |
| 56 | x | | | | | | | | | | x | |
| 57 | x | | | | | | | | | | x | |
| 58 | x | | | | | | | | | | x | |
| 59 | x | | | | | | | | | | x | |
| 60 | x | | | | | | x | | | | | |
| 61 | | x | | | | | | x | | | | |
| 62 | | x | | | | | x | | | | | |
| 63 | x | | | | | | x | | | | | |
| 64 | | x | | | | | | x | | | | |
| 65 | x | | | | | | | x | | | | |
| 66 | | x | | | | | | x | | | | |
| 67 | | | x | | | | | x | | | | |
| 68 | | x | | | | | | x | | | | |
| 69 | | | x | | | | | x | | | | |
| 70 | | x | | | | | x | | | | | |
| 71 | | x | | | | | x | | | | | |
| 72 | | x | | | | | x | | | | | |
| 73 | x | | | | | | | | x | | | |
| 74 | | | x | | | | | | x | | | |
| 75 | | x | | | | | | | x | | | |
| 76 | | x | | | | | | | x | | | |
| 77 | | x | | | | | | | | | x | |
| 78 | x | | | | | | | | | | x | |
| 79 | x | | | | | | | | | | x | |
| 80 | | x | | | | | | | | | x | |
| 81 | | x | | | | | | | | | | x |
| 82 | | x | | | | | | | | | | x |
| 83 | | x | | | | | | | | | | x |
| 84 | | x | | | | | | | | | | x |
| 85 | | x | | | | | | | | | | x |
| 86 | | x | | | | | | | | | | x |
| 87 | x | | | | | | | | | | | x |
| 88 | | x | | | | | | | | | | x |
| 89 | | x | | | | | | | | | | x |
| 90 | | x | | | | | | | | | | x |
| 91 | x | | | | | | | | | | | x |
| 92 | x | | | | | | | | | | | x |
| 93 | x | | | | | | | | | | | x |
| 94 | x | | | | | | | | | | | x |
| 95 | x | | | | | | | | | | | x |
| 96 | x | | | | | | | | | | | x |
| 97 | | x | | | | | | | | | | x |
| 98 | x | | | | | | | | | | | x |
| 99 | | x | | | | | | | | | | x |
| 100 | | x | | | | | | | | | | x |
| 101 | | x | | | | | | | | | | x |
| 102 | | x | | | | | | | | | | x |

| | Difficulty Level | | | Learning Objectives | | | | | | | | |
|-----|------------------|----------|-----------|---------------------|------|------|------|------|------|------|------|------|
| | Easy | Moderate | Difficult | LO 1 | LO 2 | LO 3 | LO 4 | LO 5 | LO 6 | LO 7 | LO 8 | LO 9 |
| 103 | | x | | | | | | | | | | x |
| 104 | | x | | | | | | | | | | x |
| 105 | x | | | | | | | | | | | x |
| 106 | | x | | | | | | | | | | x |
| 107 | | x | | | | | | | | | | x |
| 108 | x | | | | | | | | | | | x |
| 109 | x | | | | | | | | | | | x |
| 110 | | x | | | | | | | | | | x |
| 111 | x | | | | | | | | | | | x |
| 112 | | x | | | | | | | | | | x |

Short Answer

| | Difficulty Level | | | Learning Objectives | | | | | | | | |
|----|------------------|----------|-----------|---------------------|------|------|------|------|------|------|------|------|
| | Easy | Moderate | Difficult | LO 1 | LO 2 | LO 3 | LO 4 | LO 5 | LO 6 | LO 7 | LO 8 | LO 9 |
| 1 | | x | | | | | | | x | | | |
| 2 | | x | | | | | | | | | | x |
| 3 | | x | | | | x | | | | | | |
| 4 | | x | | | | x | | | | | | |
| 5 | | x | | | | | x | | | | | |
| 6 | | x | | | | | | x | | | | |
| 7 | | x | | | | | | | x | | | |
| 8 | | x | | | | | | | x | | | |
| 9 | | x | | | | | | | x | | | |
| 10 | | x | | | | | | | | | | x |
| 11 | | x | | | | | | | x | | | |
| 12 | | x | | | | | | | x | | | |
| 13 | | | x | | | | | | | x | | |

Problem

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

TRUE/FALSE

1. An investment in inventory yields a return when it is sold to a third party.
ANS: T DIF: Moderate OBJ: 17-1
2. An organization's value chain can aid in the reduction of non-value added activities.
ANS: T DIF: Easy OBJ: 17-1
3. Purchases of inventory create a continuous cash outflow each period.
ANS: T DIF: Moderate OBJ: 17-2
4. Efficient inventory management relies largely on cost-minimization strategies.
ANS: T DIF: Easy OBJ: 17-2
5. Fixed factory overhead is typically the production cost least likely to be minimized in the short run.
ANS: T DIF: Moderate OBJ: 17-2
6. In a push system of production control, inventory is produced in anticipation of customer or work center demand
ANS: T DIF: Easy OBJ: 17-3
7. In a pull system of production control, inventory is produced in anticipation of customer or work center demand
ANS: F DIF: Easy OBJ: 17-3
8. The product life cycle has a significant impact on costs and profits.
ANS: T DIF: Easy OBJ: 17-4
9. Virtual reality has been used increasingly in the product design stage.
ANS: T DIF: Easy OBJ: 17-5
10. Profit maximization is the major focus of value engineering.
ANS: F DIF: Moderate OBJ: 17-5
11. Cost minimization is the major focus of value engineering.
ANS: T DIF: Moderate OBJ: 17-5
12. Kaizen costing is most often applied to new products.
ANS: F DIF: Moderate OBJ: 17-5

13. Target costing is most frequently used in the development stage of a product.
ANS: T DIF: Moderate OBJ: 17-5
14. In a just-in-time (JIT) environment, the optimal situation is to have only one vendor for any given item.
ANS: T DIF: Moderate OBJ: 17-6
15. In a just-in-time (JIT) environment, design changes may be made at any time during the production process.
ANS: F DIF: Moderate OBJ: 17-6
16. In a just-in-time (JIT) environment, design changes must be made early in the production process.
ANS: T DIF: Moderate OBJ: 17-6
17. In a just-in-time (JIT) environment, quality is determined continually during the manufacturing process.
ANS: T DIF: Moderate OBJ: 17-6
18. In a just-in-time (JIT) environment, quality is determined at quality control checkpoints in the manufacturing process.
ANS: F DIF: Moderate OBJ: 17-6
19. In a just-in-time (JIT) environment, machines and workers are often rearranged into manufacturing cells.
ANS: T DIF: Moderate OBJ: 17-6
20. In a just-in-time (JIT) environment, end-of-period variance analysis and reporting does not occur.
ANS: T DIF: Moderate OBJ: 17-6
21. Backflush costing requires fewer allocations than traditional accounting methods.
ANS: T DIF: Moderate OBJ: 17-6
22. When a flexible manufacturing system (FMS) is used, worker tasks are more diverse than under a traditional manufacturing system.
ANS: T DIF: Moderate OBJ: 17-7
23. When a flexible manufacturing system (FMS) is used, response time to needs of the market is slower than under a traditional manufacturing system.
ANS: F DIF: Moderate OBJ: 17-7

24. Lean manufacturing and just-in-time (JIT) systems are both concerned with reduction of inventory levels.

ANS: T DIF: Easy OBJ: 17-7

25. Bottlenecks in a production process will cause other parts of the process to experience idle time.

ANS: T DIF: Moderate OBJ: 17-8

26. Economic order quantity (EOQ) is compatible with just-in-time systems.

ANS: F DIF: Moderate OBJ: 17-9

27. The EOQ formula can be modified to calculate the number of units that should be manufactured in a production run.

ANS: T DIF: Moderate OBJ: 17-9

COMPLETION

1. The interrelationships between an organization and its suppliers and customers are collectively referred to as a(n)_____.

ANS: value chain

DIF: Easy OBJ: 17-1

2. The quoted price for inventory minus discounts plus shipping charges is referred to as the _____.

ANS: purchasing cost

DIF: Easy OBJ: 17-2

3. A system of inventory production where goods are produced in anticipation of customer orders is referred to as a _____.

ANS: push system

DIF: Easy OBJ: 17-3

4. A system of producing inventory where goods are produced only when needed by a customer or work center is referred to as a _____.

ANS: pull system

DIF: Easy OBJ: 17-3

5. A method of product costing that develops an allowable product cost by estimating what the market will pay for a product with specific characteristics is referred to as _____.

ANS: target costing

DIF: Moderate OBJ: 17-5

6. An artificial, computer-generated environment in which the user has the impression of being a part of the environment is referred to as _____.

ANS: virtual reality

DIF: Easy OBJ: 17-5

7. A search for various feasible combinations of resources and methods that will increase functionality and reduce costs is referred to as _____.

ANS: value engineering

DIF: Moderate OBJ: 17-5

8. A costing method that involves ongoing efforts for continuous improvement to reduce product costs, increase product quality and improve the production process after manufacturing activities have begun is referred to as _____.

ANS: kaizen costing

DIF: Moderate OBJ: 17-5

9. The cooperative strategic planning, controlling, and problem solving activities conducted by a company and its vendors and customers to generate efficient and effective transfers of goods and services is referred to as _____.

ANS: supply chain management

DIF: Moderate OBJ: 17-6

10. Making only those items in demand by customers and making those items without waste is referred to as _____.

ANS: lean manufacturing

DIF: Moderate OBJ: 17-7

11. The theory that the flow of goods through a production process cannot be at a faster rate than the slowest constraint in the process is known as _____.

ANS: theory of constraints (TOC)

DIF: Easy OBJ: 17-8

12. A formula that indicates the optimal number of units to order is referred to as _____.

ANS: economic order quantity (EOQ)

DIF: Moderate OBJ: 17-9

MULTIPLE CHOICE

1. Which of the following is **not** an ordering cost?

- a. cost of receiving inventory
- b. cost of preparing the order
- c. cost of the merchandise ordered
- d. cost of storing the inventory

ANS: D DIF: Easy OBJ: 17-2

2. The cost of receiving inventory is regarded as

- a. an ordering cost.
- b. a carrying cost.
- c. a purchasing cost.
- d. a cost of not carrying goods in stock.

ANS: A DIF: Easy OBJ: 17-2

3. A _____ system of production control is paced by product demand.

- a. EOQ
- b. ABC
- c. push
- d. pull

ANS: D DIF: Easy OBJ: 17-3

4. Which of the following statements is **false** concerning electronic data interchange?

- a. Electronic data interchange (EDI) is essential in a pull system.
- b. One of the benefits realized by EDI organizations is a faster processing of transactions.
- c. Electronic data interchange is essential in a push system.
- d. Electronic data interchange refers to computer-to-computer exchange of information.

ANS: C DIF: Moderate OBJ: 17-6

5. _____ is a "pull" system of production and inventory control.

- a. EDI
- b. EOQ
- c. JIT
- d. ABC

ANS: C DIF: Easy OBJ: 17-6

6. In a JIT system, the quality of each product begins with
- a company's vendors.
 - employees.
 - inspection of finished goods inventory.
 - a good product warranty.

ANS: A DIF: Easy OBJ: 17-6

7. Reducing setup time is a major aspect of
- all push inventory systems.
 - the determination of safety stock quantities.
 - a JIT system.
 - an EOQ system.

ANS: C DIF: Easy OBJ: 17-6

8. Reducing inventory to the lowest possible levels is a major focus of
- JIT.
 - push inventory systems.
 - EOQ.
 - ABC.

ANS: A DIF: Easy OBJ: 17-6

9. JIT is a philosophy concerned with
- when to do something.
 - how to do something.
 - where to do something.
 - how much of something should be done.

ANS: A DIF: Easy OBJ: 17-6

10. When JIT is implemented, which of the following changes in the accounting system would **not** be expected?
- fewer cost allocations
 - elimination of standard costs
 - combining labor and overhead into one product cost category
 - combining raw material and materials in work-in-process into one product cost category

ANS: B DIF: Moderate OBJ: 17-6

11. Striving for flexibility in the number of products that can be produced in a short period of time is characteristic of
- EOQ systems.
 - push systems in general.
 - JIT.
 - pull systems in general.

ANS: C DIF: Easy OBJ: 17-6

12. Just-in-time (JIT) inventory systems
- a. result in a greater number of suppliers for each production process.
 - b. focus on a "push" type of production system.
 - c. can only be used with automated production processes.
 - d. result in inventories being either greatly reduced or eliminated.

ANS: D DIF: Easy OBJ: 17-6

13. The JIT philosophy does **not** focus on
- a. standardizing parts used in products.
 - b. eliminating waste in the production process.
 - c. finding the absolute lowest price for purchased parts.
 - d. improving quality of output.

ANS: C DIF: Easy OBJ: 17-6

14. In a JIT manufacturing environment, product costing information is **least** important for use in
- a. work in process inventory valuation.
 - b. pricing decisions.
 - c. product profitability analysis.
 - d. make-or-buy decisions.

ANS: A DIF: Moderate OBJ: 17-6

15. With JIT manufacturing, which of the following costs would be considered an **indirect** product cost?
- a. cost of specific-purpose equipment
 - b. cost of equipment maintenance
 - c. property taxes on the plant
 - d. salary of a manufacturing cell worker

ANS: C DIF: Easy OBJ: 17-6

16. With JIT manufacturing, which of the following costs would be considered a **direct** product cost?
- a. insurance on the plant
 - b. repair parts for machinery
 - c. janitors' salaries
 - d. salary of the plant supervisor

ANS: B DIF: Moderate OBJ: 17-6

17. Which of the following statements is **not true**?
- a. JIT manufacturing strives for zero inventories.
 - b. JIT manufacturing strives for zero defects.
 - c. JIT manufacturing uses manufacturing cells.
 - d. JIT manufacturing utilizes long lead time and few deliveries.

ANS: D DIF: Easy OBJ: 17-6

18. The JIT environment has caused a reassessment of product costing techniques. Which of the following statements is **true** with respect to this reassessment?
- a. Traditional cost allocations based on direct labor are being questioned and criticized.
 - b. The federal government, through the SEC, is responsible for the reassessment.
 - c. The reassessment is caused by the replacement of machine hours with labor hours.
 - d. None of the above is true.

ANS: A DIF: Moderate OBJ: 17-6

19. When a firm adopts the just-in-time method of management,
- a. employees are retrained on different equipment, but the plant layout generally remains unchanged.
 - b. new machinery and equipment must be purchased from franchised JIT dealers.
 - c. machinery and equipment are moved into small autonomous production lines called islands or cells.
 - d. new, more efficient machinery and equipment are purchased and installed in the original plant layout.

ANS: C DIF: Moderate OBJ: 17-6

20. Which of the following describes the effect on direct labor when management adopts the JIT philosophy?
- a. Each direct labor person performs a single task, thereby allowing that person to reach his or her theoretical potential.
 - b. Because each person runs a single machine in a JIT environment, there are more employees classified as direct labor.
 - c. The environment becomes more labor-intensive.
 - d. Machine operators are expected to run several different types of machines, help set up for production runs, and identify and repair machinery needing maintenance.

ANS: D DIF: Moderate OBJ: 17-6

21. JIT concepts
- a. can be effectively implemented in organizations that are only partially automated.
 - b. are only appropriate for use with CIM systems.
 - c. involve shifting from a capital-intensive to a labor-intensive process.
 - d. require full computerization of the JIT manufacturing process.

ANS: A DIF: Easy OBJ: 17-6

22. According to JIT philosophy,
- a. inventories of finished goods always should be available to meet customer demand.
 - b. push-through manufacturing flows are the most efficient.
 - c. maintaining inventories wastes resources and frequently covers up poor work or other problems.
 - d. long production runs and large production lot sizes take advantage of economies of scale.

ANS: C DIF: Moderate OBJ: 17-6

23. Accounting for product costs in a JIT environment
- a. uses a job order costing system.
 - b. classifies processing costs as raw (or direct) material, direct labor, and overhead.
 - c. is more complex than in other types of manufacturing environments.
 - d. follows process costing procedures whereby costs are accumulated by the process (cell) and attached to units processed for the period.

ANS: D DIF: Moderate OBJ: 17-6

24. An implication of the demand-pull nature of the JIT production process is that
- finished goods inventories must be available to meet customer demand, although raw material is delivered on an as-needed basis.
 - more storage space for inventories is necessary.
 - finished products are packaged and shipped to customers immediately, thus requiring minimal finished goods inventories.
 - problem areas become less visible as inventories are reduced.

ANS: C DIF: Moderate OBJ: 17-6

25. In accounting for JIT operations, the Raw Material Inventory account
- is closely monitored to ensure that materials are always on hand in time.
 - can be expected to have a larger balance than with traditional manufacturing methods.
 - is combined with the Work In Process Inventory account.
 - is combined with the Finished Goods Inventory account.

ANS: C DIF: Easy OBJ: 17-6

26. A kanban plays an important role in
- JIT.
 - EOQ.
 - ABC.
 - CPM.

ANS: A DIF: Easy OBJ: 17-6

27. _____ may involve relocation or plant modernization by a vendor.
- Focused factory arrangements
 - Economic order quantity
 - Multiprocess handling
 - Activity-based management

ANS: B DIF: Moderate OBJ: 17-9

28. The term "cell" is used to describe
- a grouping of one or more automated machines within a company.
 - a storage bin for "C" type inventory in an ABC inventory system.
 - files in a CAD/CAM system.
 - a factory's area of conversion activity.

ANS: A DIF: Easy OBJ: 17-6

29. In a production cell,
- an individual worker may be expected to operate several different machines, do setups, and perform preventive maintenance on the equipment.
 - each worker becomes an expert in the operation of a single piece of equipment.
 - machines are arranged so that similar machines are grouped together.
 - clear separation is maintained between those workers who operate the machinery and those workers who set up and maintain the machinery.

ANS: A DIF: Moderate OBJ: 17-6

30. U-shaped groupings of workers and machines that improve materials handling and flow are known as
- manufacturing cells.
 - efficiency stations.
 - multi-flow modules.
 - productivity islands.

ANS: A DIF: Easy OBJ: 17-6

31. For workers in a multiprocess handling situation, which of the following happens?

More flexibility Less process involvement

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

ANS: D DIF: Easy OBJ: 17-6

32. The process of _____ occurs when equipment is programmed to stop when a certain situation arises.
- throughput
 - automation
 - backflushing
 - information sharing

ANS: B DIF: Easy OBJ: 17-6

33. The connection of two or more flexible manufacturing systems via a host computer and a networking information system is known as

computer integrated electronic data
manufacturing interchange

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

ANS: B DIF: Easy OBJ: 17-7

34. A key element of Japan's success in world markets is
- the elimination of waste in all operations.
 - automation of the billing function.
 - inefficient labor forces in competing countries.
 - the verification procedures incorporated into computer programs.

ANS: A DIF: Easy OBJ: 17-7

35. Backflush costing is concerned with which of the following?

| <u>Standard costs</u> | <u>Minimal variances from standards</u> |
|-----------------------|---|
| a. yes | no |
| b. no | no |
| c. yes | yes |
| d. no | yes |

ANS: C DIF: Easy OBJ: 17-6

36. Which of the following areas offers an opportunity to eliminate waste?

- a. raw material and labor
- b. space and production time
- c. recordkeeping and working capital
- d. all of the above

ANS: D DIF: Easy OBJ: 17-7

37. Flexible manufacturing systems are

- a. designed to provide more flexibility in a firm's manufacturing process by using computer-aided machinery.
- b. the same as computer-aided design systems.
- c. commonly used by firms that need to make large quantities of one product.
- d. are very complicated and cause increased defect rates in output.

ANS: A DIF: Easy OBJ: 17-7

38. Kaizen means

- a. doing it the Japanese way.
- b. continuous improvement.
- c. employee empowerment.
- d. implementation of a centralized organizational structure.

ANS: B DIF: Easy OBJ: 17-5

39. The process that determines an allowable product cost while setting market price and allowing for an acceptable profit margin is known as

- a. target costing.
- b. product life cycle costing.
- c. activity-based costing.
- d. responsibility costing.

ANS: A DIF: Easy OBJ: 17-5

40. The peak level of unit sales will occur in which stage of the product life cycle?

- a. growth
- b. maturity
- c. decline
- d. introduction

ANS: B DIF: Easy OBJ: 17-4

41. For product life cycle costing, R&D costs are
- a. expensed as incurred.
 - b. capitalized and allocated over the life cycle.
 - c. deducted as period costs.
 - d. charged to specific departments as incurred.

ANS: B DIF: Easy OBJ: 17-4

42. An important focus in product life cycle costing is
- a. the activity base.
 - b. the target cost.
 - c. the cost driver.
 - d. variable costs.

ANS: B DIF: Easy OBJ: 17-4

43. Projected sales price minus a reasonable profit equals
- a. the standard cost.
 - b. contribution margin.
 - c. projected Cost of Goods Sold.
 - d. target cost.

ANS: D DIF: Easy OBJ: 17-5

44. Approximately what percentage of future product costs is determined in the development stage of the product life cycle?
- a. 30%
 - b. 50%
 - c. 70%
 - d. 90%

ANS: D DIF: Easy OBJ: 17-4

45. Which of the following fluctuate over the product life cycle?
- a. sales price per unit
 - b. the types of costs that are incurred
 - c. product profitability
 - d. all of the above

ANS: D DIF: Easy OBJ: 17-4

46. In which of the following stages of the product life cycle would operating losses **not** be expected?
- a. growth
 - b. development
 - c. introduction
 - d. decline

ANS: A DIF: Easy OBJ: 17-4

47. During which stage of the product life cycle will a company witness the highest profit?
- development
 - maturity
 - growth
 - decline

ANS: C DIF: Easy OBJ: 17-4

48. Cost tables are databases that provide information on which of the following?
- design specifications
 - manufacturing processes
 - impact on product costs when different inputs resources are used
 - all of the above

ANS: D DIF: Easy OBJ: 17-5

49. Ongoing efforts to reduce costs, increase product quality, and/or improve production process once manufacturing has begun is known as
- cost management.
 - kaizen costing.
 - target costing.
 - life-cycle costing.

ANS: B DIF: Easy OBJ: 17-5

50. Kaizen costing is used for which of the following types of products?

| <u>New products</u> | <u>Existing products</u> |
|---------------------|--------------------------|
|---------------------|--------------------------|

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

ANS: B DIF: Easy OBJ: 17-5

51. A mandate to reduce costs, increase product quality, and/or improve production processes through continuous improvement is known as
- kaizen costing.
 - activity-based costing.
 - the theory of constraints.
 - mass customization.

ANS: A DIF: Easy OBJ: 17-5

52. If life-cycle costs exceed the target cost of a product, managers will strive to reduce
- the cost of special orders.
 - the level of activities that are non-value-added.
 - product variety.
 - period costs.

ANS: B DIF: Easy OBJ: 17-5

53. The projected sales price for a new product (which is still in the development stage of the product life cycle) is \$50. The company has estimated the life-cycle cost to be \$30 and the first-year cost to be \$60. On this type of product, the company requires a \$12 per unit profit. What is the target cost of the new product?
- a. \$60
 - b. \$30
 - c. \$38
 - d. \$42

ANS: C DIF: Easy OBJ: 17-5

54. The theory of constraints can
- a. identify what limitations exist with raw material suppliers.
 - b. follows a methodology similar to linear programming.
 - c. be ignored since it assumes too many estimates in the production cycle.
 - d. show where bottlenecks exist and sets the limit of output to these bottlenecks.

ANS: D DIF: Easy OBJ: 17-8

55. Placing quality inspection points ahead of bottlenecks will reduce
- a. product flow.
 - b. the number of defective products.
 - c. the influence of constraints on production flow.
 - d. the critical path time.

ANS: C DIF: Moderate OBJ: 17-8

56. Quality inspection points should
- a. precede bottlenecks.
 - b. follow bottlenecks.
 - c. be placed at the end of all production processes.
 - d. be placed at random points in the manufacturing process.

ANS: A DIF: Easy OBJ: 17-8

57. The flow of goods through a production process cannot be at a faster rate than the slowest bottleneck is the definition for
- a. mass customization.
 - b. business process reengineering.
 - c. the theory of constraints.
 - d. the Pareto principle.

ANS: C DIF: Easy OBJ: 17-8

58. Bottlenecks are
- a. machine constraints in the production line.
 - b. machine constraints that restrict the production cycle so idle time at other processes occurs.
 - c. useful for identifying any production spot slowdown.
 - d. restrictions on raw material sources but not the quantity of output.

ANS: B DIF: Easy OBJ: 17-8

59. In analyzing production flow, a bottleneck is
- an intermediate inventory.
 - always off the critical path.
 - a capacity constraint.
 - related to a non-value-adding activity.

ANS: C DIF: Easy OBJ: 17-8

60. Product profit margins are typically judged on a

Period-by-period basis Life-cycle basis

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

ANS: B DIF: Easy OBJ: 17-4

61. Which approaches to costing should be associated with each of the following life-cycle stages?

Development Introduction Maturity

- | | | |
|-----------|----------|----------|
| a. Kaizen | Target | Standard |
| b. Target | Standard | Kaizen |
| c. Target | Kaizen | Standard |
| d. Kaizen | Standard | Target |

ANS: C DIF: Moderate OBJ: 17-5

62. In the introduction stage of a product's life-cycle, which of the following type of costs typically may create losses rather than profits?

- advertising
- assembly
- design
- overhead

ANS: A DIF: Moderate OBJ: 17-4

63. Most studies have indicated that what percent of a product's total life-cycle costs are determined in the development/design stage?

- 60%-70%
- 70%-80%
- 80%-90%
- 90%-95%

ANS: C DIF: Easy OBJ: 17-4

64. Which of the following costing methods is the most effective in controlling a product's total life-cycle cost?
- a. kaizen costing
 - b. target costing
 - c. standard costing
 - d. process costing

ANS: B DIF: Moderate OBJ: 17-5

65. Which of the following formulas is the best representation of the concept of target costing?
- a. $\text{target cost} + \text{profit margin} = \text{selling price}$
 - b. $\text{selling price} - \text{target cost} = \text{profit margin}$
 - c. $\text{selling price} - \text{profit margin} = \text{target cost}$
 - d. $\text{target cost} - \text{standard cost} = \text{profit margin}$

ANS: C DIF: Easy OBJ: 17-5

66. Successful product development should include
- a. kaizen costing.
 - b. value engineering.
 - c. kanban implementation.
 - d. all of the above.

ANS: B DIF: Moderate OBJ: 17-5

67. Value engineering seeks to obtain increased
- a. product life-cycle and reduced direct labor inputs.
 - b. planning team membership and reduced time-to-market.
 - c. product performance ratio and reduced substitute goods.
 - d. product functionality and reduced costs.

ANS: D DIF: Difficult OBJ: 17-5

68. Target costing
- a. can be applied to services if they are sufficiently uniform.
 - b. can be applied to services only if they are automated.
 - c. can be applied to services that are performed in a manufacturing environment.
 - d. cannot be applied to services.

ANS: A DIF: Moderate OBJ: 17-5

69. Kaizen costing helps to
- a. reduce product costs of products in the design and development stage.
 - b. keep the target cost as the primary focus after a product enters production.
 - c. keep profit margin relatively stable as product price declines over the product life cycle.
 - d. reduce the cost of engineering change orders during each stage of the product life cycle.

ANS: C DIF: Difficult OBJ: 17-5

70. In which life-cycle stage are product quality improvements and stable selling prices likely to occur?
- introduction
 - growth
 - maturity
 - decline

ANS: B DIF: Moderate OBJ: 17-4

71. From a cost management view, research and development cost represents
- a life-cycle investment
 - a period expense.
 - an unearned revenue.
 - a risk reserve.

ANS: A DIF: Moderate OBJ: 17-4

72. Life-cycle costing is especially important in which of the following types of companies?

| <u>Computers</u> | <u>Furniture</u> | <u>Textbooks</u> | <u>Automobiles</u> |
|------------------|------------------|------------------|--------------------|
| a. yes | yes | yes | yes |
| b. no | yes | yes | no |
| c. yes | no | no | yes |
| d. yes | no | yes | yes |

ANS: C DIF: Moderate OBJ: 17-4

73. *Kanban* is the Japanese word for
- production.
 - just-in-time.
 - card.
 - target costing.

ANS: C DIF: Easy OBJ: 17-6

74. JIT seeks to
- reduce production cost while increasing quality.
 - radically redesign the production process for effectiveness.
 - modify all non-value-added activities.
 - all of the above.

ANS: A DIF: Difficult OBJ: 17-6

75. The JIT philosophy indicates that inventory, as well as which of the following, should be eliminated?

| <u>Suppliers</u> | <u>Storage</u> | <u>Employees</u> | <u>Business-Value-Added Activities</u> |
|------------------|----------------|------------------|--|
| a. yes | yes | yes | yes |
| b. yes | yes | no | no |
| c. no | no | yes | no |
| d. no | yes | no | yes |

ANS: D DIF: Moderate OBJ: 17-6

76. Companies have often produced significant amounts of unwanted inventory because of
- variable overhead allocation methodologies.
 - fixed overhead allocation methodologies.
 - variable and fixed overhead allocation methodologies.
 - the financial accounting requirement to expense research and development as incurred.

ANS: B DIF: Moderate OBJ: 17-6

77. Goods will flow through a production process at the rate of the
- slowest part of the process.
 - fastest part of the process.
 - average of all the parts of the process.
 - time standards set using externally calibrated benchmarks.

ANS: A DIF: Moderate OBJ: 17-8

78. A machine constraint creates
- an automation.
 - a bottleneck.
 - a push inventory system.
 - the need for third-party logistics.

ANS: B DIF: Easy OBJ: 17-8

79. In a production process with a machine constraint, if a quality control point is to be established, it should be set up
- within the machine's processes.
 - directly after the machine has performed its functions.
 - immediately before the machine.
 - at the end of the production process.

ANS: C DIF: Easy OBJ: 17-8

80. Managing constraints is a process of
- backflush costing.
 - design for manufacturability.
 - just-in-time redesign.
 - continuous improvement.

ANS: D DIF: Moderate OBJ: 17-8

81. Precious Jewels Corporation produces quality jewelry items for various retailers. For the coming year, it has estimated it will consume 500 ounces of gold. Its carrying costs for a year are \$2 per ounce. No safety stock is maintained. If the EOQ is 100 ounces, what is the cost per order?
- \$40
 - \$20
 - \$5
 - \$25

ANS: B

| |
|---|
| $\begin{aligned} \text{EOQ} = 100 &= \sqrt{2(500)(x) / 2} \\ 10,000 &= 500x \\ \$20 &= x \end{aligned}$ |
|---|

DIF: Moderate OBJ: 17-9

82. Precious Jewels Corporation produces quality jewelry items for various retailers. For the coming year, it has estimated it will consume 500 ounces of gold. Its carrying costs for a year are \$2 per ounce. No safety stock is maintained. If the EOQ is 100 ounces, what would be the estimate for Precious Jewels' total carrying costs for the coming year?
- \$200
 - \$250
 - \$100
 - \$1,000

ANS: C

$$500 \text{ oz} / 100 \text{ oz} = 5 \text{ orders per year} * \$20 \text{ per order cost} = \$100$$

DIF: Moderate OBJ: 17-9

83. A firm estimates that its annual carrying cost for material X is \$.30 per lb. If the firm requires 50,000 lbs. per year, and ordering costs are \$100 per order, what is the EOQ (rounded to the nearest pound)?
- 5,774 lbs.
 - 4,082 lbs.
 - 1,732 lbs.
 - 1,225 lbs.

ANS: A

$$\text{EOQ} = \sqrt{((2)(50,000)(100)) / .30}$$

$$\text{EOQ} = 5,774 \text{ lbs.}$$

DIF: Moderate OBJ: 17-9

Zedlar Corporation

Zedlar Corporation's EOQ for Material A is 500 units. This EOQ is based on:

| | |
|----------------|-------------|
| Annual demand | 5,000 units |
| Ordering costs | \$12.50 |

84. Refer to Zedlar Corporation. What is the annual carrying cost per unit for Material A?
- \$0.50
 - \$2.00
 - \$2.50
 - \$5.00

ANS: A

$$\text{EOQ} = 500 \text{ units} = \sqrt{((2)(5000)(12.50)) / CC}$$

$$CC = \$0.50$$

DIF: Moderate OBJ: 17-9

85. Refer to Zedlar Corporation. What are Zedlar's Corp.'s total annual ordering costs for Material A?
- a. \$6,000
 - b. \$600
 - c. \$125
 - d. \$1,000

ANS: C

of orders per year = $5,000/500 = 10$ orders per year
10 orders per year * \$12.50 = \$125.00

DIF: Moderate OBJ: 17-9

Clear Day Corporation

Clear Day Corporation manufactures various glass products including a car window. The setup cost to produce the car window is \$1,200. The cost to carry a window in inventory is \$3 per year. Annual demand for the car window is 12,000 units.

86. Refer to Clear Day Corporation. What is the most economical production run (rounded to the nearest unit)?
- a. 6,000 units
 - b. 3,000 units
 - c. 9,295 units
 - d. 3,098 units

ANS: D

$EOQ = \sqrt{((2)(12,000)(1,200)) / 3}$
EOQ = 3,098 units

DIF: Moderate OBJ: 17-9

87. Refer to Clear Day Corporation. If the annual demand for the car window was to increase to 15,000 units,
- a. the number of setups would decrease.
 - b. the total carrying costs would increase.
 - c. the economic order quantity would decline.
 - d. all of the above would occur.

ANS: B DIF: Easy OBJ: 17-9

88. A company has estimated its economic order quantity for Part A at 2,400 units for the coming year. If ordering costs are \$200 and carrying costs are \$.50 per unit per year, what is the estimated total annual usage?
- a. 6,000 units
 - b. 28,800 units
 - c. 7,200 units
 - d. 2,400 units

ANS: C

$$\text{EOQ} = 2,400 \text{ units} = \sqrt{((2)(200)(AU)) / (.50)}$$
$$\text{AU} = 7,200 \text{ units}$$

DIF: Moderate OBJ: 17-9

89. A company annually consumes 10,000 units of Part C. The carrying cost of this part is \$2 per year and the ordering costs are \$100. The company uses an order quantity of 500 units. By how much could the company reduce its total costs if it purchased the economic order quantity instead of 500 units?
- a. \$500
 - b. \$2,000
 - c. \$2,500
 - d. \$0

ANS: A

$$\text{EOQ} = \sqrt{((2)(10,000)(100)) / 2}$$

$$\text{EOQ} = 1,000 \text{ units}$$

At present, 20 orders are placed for a total annual cost of \$2,000. If the EOQ is used, 10 orders will be placed at a cost of \$1,000

Because an average of an additional 250 units will be on hand, carrying costs will increase by \$500. The net difference is a savings of \$500.

DIF: Moderate OBJ: 17-9

90. A company annually consumes 10,000 units of Part C. The carrying cost of this part is \$2 per year and the ordering costs are \$100. The company uses an order quantity of 500 units. If the company operates 200 days per year, and the lead time for ordering Part C is 5 days, what is the order point?
- a. 250 units
 - b. 1,000 units
 - c. 500 units
 - d. 2,000 units

ANS: A

$$\begin{aligned} \text{Order point} &= \text{Daily use} * \text{Lead time} \\ &= (10,000/200) * 5 \\ &= 250 \text{ units} \end{aligned}$$

DIF: Moderate OBJ: 17-9

91. Which of the following tells management "when" to order?
- a. safety stock level
 - b. order point
 - c. the economic order quantity
 - d. the Pareto inventory analysis

ANS: B DIF: Easy OBJ: 17-9

92. Which of the following affects the order point?
- a. daily usage
 - b. lead time
 - c. safety stock
 - d. all of the above

ANS: D DIF: Easy OBJ: 17-9

93. A decrease in the lead time would reduce the
- a. order point.
 - b. safety stock.
 - c. economic order quantity.
 - d. ordering costs.

ANS: A DIF: Easy OBJ: 17-9

94. The size of the safety stock is directly affected by all of the following, **except** the
- a. cost of a stockout.
 - b. probability of a stockout.
 - c. carrying cost of stock.
 - d. economic order quantity.

ANS: D DIF: Easy OBJ: 17-9

95. If no safety stock is carried, the average inventory is equal to the
- a. order point/2.
 - b. order point x 2.
 - c. economic order quantity/2.
 - d. economic order quantity x 2.

ANS: C DIF: Easy OBJ: 17-9

96. The role of safety stock in an organization is to
- a. reduce the lead time for an order to be received.
 - b. reduce the probability of a stockout.
 - c. reduce the order point.
 - d. decrease the economic order quantity.

ANS: B DIF: Easy OBJ: 17-9

97. The optimal size of the safety stock is defined by the point where the
- a. costs of carrying the safety stock equal stockout costs.
 - b. setup costs equal stockout costs.
 - c. ordering costs equal stockout costs.
 - d. reorder point equals safety stock.

ANS: A DIF: Moderate OBJ: 17-9

98. If a company carries safety stock and its annual carrying costs per unit are \$0.30, what formula yields the total annual carrying costs?
- a. $\$0.30 \times [(\text{EOQ}/2) + \text{Safety stock}]$
 - b. $\$0.30 \times (\text{EOQ} + \text{Safety stock})$
 - c. $\$0.30 \times [(\text{EOQ} \times 2) + \text{Safety stock}]$
 - d. $\$0.30 \times (\text{EOQ} - \text{Safety stock})$

ANS: A

DIF: Easy

OBJ: 17-9

Douglas Corporation

Douglas Corporation operates its factory 300 days per year. Its annual consumption of Material Y is 1,200,000 gallons. It carries a 10,000 gallon safety stock of Material Y and its lead time is 12 business days.

99. Refer to Douglas Corporation. What is the order point for Material Y?
- a. 10,000 gallons
 - b. 38,000 gallons
 - c. 48,000 gallons
 - d. 58,000 gallons

ANS: D

| |
|--|
| $\begin{aligned}\text{Order point} &= (\text{Daily use} \times \text{Lead time}) + \text{Safety Stock} \\ &= (4,000 \times 12) + 10,000 \\ &= 58,000 \text{ gallons}\end{aligned}$ |
|--|

DIF: Moderate

OBJ: 17-9

100. Refer to Douglas Corporation. If the EOQ for Material Y is 30,000 gallons, and the carrying cost per gallon per year is \$.25, what is the total annual carrying cost for Material Y?
- a. \$3,750
 - b. \$7,500
 - c. \$6,250
 - d. \$10,000

ANS: C

| |
|--|
| $\begin{aligned}\text{Annual carrying cost} &= [(\text{EOQ}/2) + \text{Safety stock}] \times \text{per unit carrying cost} \\ &= (15,000 + 10,000) \times \$0.25 \\ &= \$6,250\end{aligned}$ |
|--|

DIF: Moderate

OBJ: 17-9

101. Atkins Corporation consumes 1,200,000 gallons of Material Y per year. Its order quantity is 30,000 gallons. It maintains a safety stock of 10,000 gallons and its annual carrying costs are \$0.25 per gallon per year. If the ordering cost is \$20 per order, what are the total annual ordering costs?
- a. \$600
 - b. \$800
 - c. \$8,300
 - d. \$1,200

ANS: B

| |
|--|
| $\begin{aligned}\text{Annual ordering costs} &= (1,200,000/30,000) * \$20 \\ &= 40 \text{ orders} * \$20 \\ &= \$800\end{aligned}$ |
|--|

DIF: Moderate OBJ: 17-9

Rawson Corporation

Rawson Corporation's order quantity for Material T is 5,000 lbs. If the company maintains a safety stock of T at 500 lbs., and its order point is 1,500 lbs.

102. Refer to Rawson Corporation. What is the lead time assuming daily usage is 50 lbs.?
- a. 30 days
 - b. 100 days
 - c. 10 days
 - d. 20 days

ANS: D

| |
|--|
| $\begin{aligned}\text{Order point} &= (\text{Daily use} * \text{Lead time}) + \text{Safety Stock} \\ 1,500 &= (50 * \text{LT}) + 500 \\ 1,000 &= (50 * \text{LT}) \\ 20 &= \text{LT}\end{aligned}$ |
|--|

DIF: Moderate OBJ: 17-9

103. Refer to Rawson Corporation. What would be the total annual carrying costs assuming the carrying cost per unit is \$0.20?
- a. \$1,000
 - b. \$600
 - c. \$100
 - d. \$1,100

ANS: B

| |
|--|
| $(5,000 \text{ units} / 2) + 500 \text{ units} = 3,000 \text{ units} * \$0.20 / \text{unit} = \$600$ |
|--|

DIF: Moderate OBJ: 17-9

104. For Raw Material B, a company maintains a safety stock of 5,000 pounds. Its average inventory (taking into account the safety stock) is 8,000 pounds. What is the apparent order quantity?
- a. 16,000 lbs.
 - b. 6,000 lbs.
 - c. 10,000 lbs.
 - d. 21,000 lbs.

ANS: B

| |
|--|
| $(8,000 - 5,000) \text{ lbs} * 2 = 6,000 \text{ lbs.}$ |
|--|

DIF: Moderate OBJ: 17-9

105. In an Pareto inventory analysis, the items that are **most likely** to be controlled with a red-line system are the
- a. A items.
 - b. B items.
 - c. C items.
 - d. items on a perpetual inventory.

ANS: C DIF: Easy OBJ: 17-9

106. Which of the following might be appropriate for items in the "C" category of an Pareto inventory analysis?
- a. a red-line system
 - b. a two-bin system
 - c. a periodic inventory system
 - d. all of the above

ANS: D DIF: Moderate OBJ: 17-9

107. The _____ would **not** affect the economic order quantity.
- a. company's weighted average cost of capital
 - b. cost of purchase requisition forms
 - c. cost of insuring inventory
 - d. cost of a stockout

ANS: D DIF: Moderate OBJ: 17-9

108. All other factors equal, a decrease in the order quantity will
- a. decrease the annual carrying costs.
 - b. decrease the annual ordering costs.
 - c. increase the lead time.
 - d. reduce the safety stock.

ANS: A DIF: Easy OBJ: 17-9

109. The economic order quantity is **not** affected by the
- a. estimate of the annual material consumption.
 - b. cost of insuring a unit of inventory for a year.
 - c. cost of purchase-order forms.
 - d. safety stock level.

ANS: D DIF: Easy OBJ: 17-9

110. A decrease in the price of a raw material could result in a(n)
- increase in the lead time.
 - increase in the EOQ.
 - decrease in the order point.
 - increase in the setup costs.

ANS: B DIF: Moderate OBJ: 17-9

111. The number of orders that will be submitted each year for raw material is given by which formula?
- Economic order quantity x order point
 - Total annual material needs/economic order quantity
 - Order point/economic order quantity
 - Total annual material needs/safety stock

ANS: B DIF: Easy OBJ: 17-9

112. The economic production run quantity directly affects the
- order point for raw material inventories.
 - safety stock for finished goods inventory.
 - level of finished goods inventory.
 - lead time for producing finished goods inventory.

ANS: C DIF: Moderate OBJ: 17-9

SHORT ANSWER

1. Why may a JIT control system be useful in disclosing a firm's inefficiencies and problems?

ANS:

The JIT control system is based on a philosophy that inventory is undesirable. Subscribers to the JIT philosophy believe inventory reductions expose organizational problems and inefficiencies. These problems and inefficiencies may not be brought to management's attention if inventories are not pushed to lower and lower levels. They would remain hidden and undetectable at higher levels of inventory.

DIF: Moderate OBJ: 17-6

2. What is the purpose of the EOQ model?

ANS:

The purpose of the EOQ model is to identify the least cost quantity of a material to be purchased at each order point. The model explicitly considers the carrying and ordering costs and identifies the purchase quantity that minimizes the total of these costs.

DIF: Moderate OBJ: 17-9

3. Why does a "push" based inventory control system generate larger inventory levels than a "pull" system?

ANS:

Larger levels of inventory exist by design in push production control systems. The inventory buffers permit lower levels of communication between business segments, permit longer production runs, and protect the firm from environmental uncertainties and unforeseen interruptions in production or supplies.

DIF: Moderate OBJ: 17-3

4. What does the term "pull" mean in the context of production control?

ANS:

Pull simply refers to the fact that the pace and level of production are geared to product demand. Each work center sets the pace for the next upstream work center. Customer demand paces the final downstream work center.

DIF: Moderate OBJ: 17-3

5. Identify and discuss how sales and costs are affected during the five stages of the product life cycle.

ANS:

The five stages of the product life cycle are (1) development, (2) introduction, (3) growth, (4) maturity, and (5) decline. In the development stage, no production costs or sales exist, but R & D costs are extremely high. During the introduction stage low unit sales exist while high advertising costs are evident. The growth stage sees increasing unit sales and decreasing production costs per unit. The maturity stage witnesses peak unit sales and a stabilization of production costs per unit. During the decline stage unit sales decrease while production costs per unit increase.

DIF: Moderate OBJ: 17-4

6. Discuss differences in approach and potential usage between target and kaizen costing.

ANS:

Target costing is considered a procedural approach that is used to determine a maximum allowable cost for a product, while kaizen costing is a mandate to reduce costs, increase product quality, and/or improve production process through continuous improvement. Target costing has a large potential for cost reduction in life-long product cost because these costs are embedded in the product during design and development. Kaizen costing has limited potential in cost reduction of existing products, but may be useful in target costing in the future.

DIF: Moderate OBJ: 17-5

7. How does adopting a JIT system affect the firm's relationship with suppliers and how must suppliers change their way of doing business?

ANS:

The JIT manufacturer will limit the number of suppliers to a few. Long-term contracts are entered into with suppliers. Suppliers' raw material must be top quality with no defects.

Small quantities of raw material are delivered frequently and little or no raw material is maintained by the buyer.

Suppliers must be located close enough to the JIT buyer to deliver small quantities very quickly. The supplier must agree to providing a top-quality product to its JIT customer.

DIF: Moderate OBJ: 17-6

8. Why is it important for a company to be (geographically) close to its suppliers to implement a JIT inventory control system?

ANS:

The geographical proximity is important to minimize shipping and handling costs of supplies and materials. Geographical proximity also facilitates frequent communication and joint planning between a supplier and customer.

DIF: Moderate OBJ: 17-6

9. Why might it be necessary to make adjustments to the accounting system in a firm that adopts JIT?

ANS:

JIT production control systems foster automation and reduced levels of inventory. Consequently, raw material inventories and direct labor costs may be too small to warrant separate cost pools-they can be combined with other cost pools.

Additional adjustments may be necessary to accommodate standard costs, which are constantly adjusted to reflect the latest technological changes in production methods. Also, more costs could be traced to specific products and fewer costs would have to be allocated.

DIF: Moderate OBJ: 17-6

10. What is the relationship between warehouse space and the length of production runs?

ANS:

Longer production runs increase the levels of specific inventories. To accommodate long production runs, significant warehouse space needs to be available for storing intermediate and final products.

DIF: Moderate OBJ: 17-9

11. What are the three primary goals of the just-in-time (JIT) philosophy?

ANS:

1. Elimination of any production process or operation that does not add value to the product or service.
2. Continuous improvement in production/performance efficiency.
3. Reduction in the total cost of production/performance while increasing quality.

DIF: Moderate OBJ: 17-6

12. What are the principal characteristics of the Internet business model?

ANS:

This model refers to a business with few physical assets, little management hierarchy, and a direct pipeline to customers.

DIF: Moderate OBJ: 17-6

13. Compare and contrast traditional manufacturing systems with flexible manufacturing systems on the following factors:

| Factor | Traditional Manufacturing | Flexible Manufacturing System |
|-------------------------------|----------------------------------|--------------------------------------|
| Product Variety | | |
| Response time to market needs | | |
| Worker tasks | | |
| Production runs | | |
| Lot sizes | | |
| Setups | | |
| Information requirements | | |
| Production activity | | |

ANS:

| Factor | Traditional Manufacturing | Flexible Manufacturing System |
|-------------------------------|----------------------------------|--------------------------------------|
| Product Variety | Limited | Extensive |
| Response time to market needs | Slow | Rapid |
| Worker tasks | Specialized | Diverse |
| Production runs | Long | Short |
| Lot sizes | Large | Small |
| Setups | Slow and expensive | Fast and inexpensive |
| Information requirements | Batch-oriented | On-line real time |
| Production activity | Labor intensive | Technology intensive |

DIF: Difficult OBJ: 17-7

PROBLEM

1. Sprint Manufacturing Company estimates that it will consume 400,000 units of Part 101 in the coming year. The ordering cost for this unit is \$3.20. What would be the carrying costs per unit if the EOQ model indicates that it is optimal to place exactly 50 orders for the upcoming year?

ANS:

If projected usage for the year is 400,000 units, the EOQ would be 8,000 units ($400,000/50$). To determine the carrying costs per unit, the following equation is solved:

ANS:

1. $EOQ = \sqrt{2PD/C}$

where EOQ = Economic order quantity

P = Cost of placing and receiving an order

D = Annual demand in units

C = annual cost of carrying one unit in stock for one year

$$EOQ = \sqrt{2(\$12)(50,000) / \$1}$$
$$= 1,095 \text{ bags}$$

2. Bags used per day = $50,000/250 = 200$ bags per working day.

3. Reorder point = Rate of usage x Lead time = $200 \text{ bags} \times 5 \text{ working days} = 1,000$ bags

4. Reorder point = (Average rate of usage x Lead time) + Safety stock
= $(200 \text{ bags} \times 5 \text{ days}) + 50 \text{ days} = 1,050$ bags

DIF: Moderate OBJ: 17-9

4. Benoit Corporation produces lawn chairs. In order to produce the frames for the furniture, special equipment must be set up. The setup cost per frame is \$50. The cost of carrying frames in inventory is \$4 per frame per year. The company produces 10,000 lawn chairs per year.

1. Compute the number of frames that should be produced per setup in order to minimize total setup and carrying costs.

2. Compute the total setup and carrying costs associated with the economic order quantity?

ANS:

1. $EOQ = \sqrt{(2)(\$50)(10,000) / \$4}$

EOQ = 500 frames should be produced per setup.

2. Total setup costs = $(\$50)(10,000/500)$
\$1,000

$$\text{Total carrying costs} = (\$4)(500/2)$$
$$= \$1,000$$

DIF: Moderate OBJ: 17-9