Chapter 5: Activity-Based Costing

MULTIPLE CHOICE QUESTIONS

1. Consider the following statements regarding traditional costing systems:

   I. Overhead costs are applied to products on the basis of volume-related measures.
   II. All manufacturing costs are easily traceable to the goods produced.
   III. Traditional costing systems tend to distort unit manufacturing costs when numerous goods are made that have widely varying production requirements.

   Which of the above statements is (are) true?
   A. I only.
   B. II only.
   C. III only.
   D. I and III.
   E. II and III.

   Answer: D LO: 1 Type: N

2. Many traditional costing systems:
   A. trace manufacturing overhead to individual activities and require the development of numerous activity-costing rates.
   B. write off manufacturing overhead as an expense of the current period.
   C. combine widely varying elements of overhead into a single cost pool.
   D. use a host of different cost drivers (e.g., number of production setups, inspection hours, orders processed) to improve the accuracy of product costing.
   E. produce results far superior to those achieved with activity-based costing.

   Answer: C LO: 1 Type: N

3. The following tasks are associated with an activity-based costing system:

   1—Calculation of cost application rates
   2—Identification of cost drivers
   3—Assignment of cost to products
   4—Identification of cost pools

   Which of the following choices correctly expresses the proper order of the preceding tasks?
   A. 1, 2, 3, 4.
   B. 2, 4, 1, 3.
   C. 3, 4, 2, 1.
   D. 4, 2, 1, 3.
   E. 4, 2, 3, 1.

   Answer: D LO: 2, 4 Type: RC

4. Which of the following is the proper sequence of events in an activity-based costing system?
   A. Identification of cost drivers, identification of cost pools, calculation of cost application rates, assignment of cost to products.
   B. Identification of cost pools, identification of cost drivers, calculation of cost application rates, assignment of cost to products.
   C. Assignment of cost to products, identification of cost pools, identification of cost drivers, calculation of cost application rates.
   D. Calculation of cost application rates, identification of cost drivers, identification of cost pools, assignment of cost to products.
   E. Some other sequence of the four activities listed above.

   Answer: B LO: 2, 4 Type: RC

5. Which of the following tasks is <u>not</u> normally associated with an activity-based costing system?
   A. Calculation of cost application rates.
   B. Identification of cost pools.
   C. Preparation of allocation matrices.
   D. Identification of cost drivers.
   E. Assignment of cost to products.

   Answer: C LO: 2, 4 Type: RC

6. Which of the following is <u>not</u> a broad, cost classification category typically used in activity-based costing?
   A. Unit-level.
   B. Batch-level.
   C. Product-sustaining level.
   D. Facility-level.
   E. Management-level.

   Answer: E LO: 3 Type: RC

7. In an activity-based costing system, direct materials used would typically be classified as a:
   A. unit-level cost.
   B. batch-level cost.
   C. product-sustaining cost.
   D. facility-level cost.
   E. matrix-level cost.

   Answer: A LO: 3 Type: N

8. Which of the following is <u>least</u> likely to be classified as a batch-level activity in an activity-based costing system?
   A. Shipping.
   B. Receiving and inspection.
   C. Production setup.
   D. Property taxes.
   E. Quality assurance.

   Answer: D LO: 3 Type: RC

9. In an activity-based costing system, materials receiving would typically be classified as a:
   A. unit-level activity.
   B. batch-level activity.
   C. product-sustaining activity.
   D. facility-level activity.
   E. period-level activity.

   Answer: B LO: 3 Type: RC

10. Foster, Inc., an appliance manufacturer, is developing a new line of ovens that uses controlled-laser technology. The research and testing costs associated with the new ovens is said to arise from a:
   A. unit-level activity.
   B. batch-level activity.
   C. product-sustaining activity.
   D. facility-level activity.
   E. competitive-level activity.

   Answer: C LO: 3 Type: N

11. Consider the following statements regarding product-sustaining activities:

   I. They must be done for each batch of product that is made.
   II. They must be done for each unit of product that is made.
   III. They are needed to support an entire product line.

   Which of the above statements is (are) true?
   A. I only.
   B. II only.
   C. III only.
   D. I and II.
   E. II and III.

   Answer: C LO: 3 Type: RC

12. Which of the following is <u>least</u> likely to be classified as a facility-level activity in an activity-based costing system?
   A. Plant maintenance.
   B. Property taxes.
   C. Machine processing cost.
   D. Plant depreciation.
   E. Plant management salaries.

   Answer: C LO: 3 Type: RC

13. The salaries of a manufacturing plant's management are said to arise from:
    A. unit-level activities.
    B. batch-level activities.
    C. product-sustaining activities.
    D. facility-level activities.
    E. direct-cost activities.

    Answer: D LO: 3 Type: RC

14. Which of the following choices correctly depicts a cost that arises from a batch-level activity and one that arises from a facility-level activity?

	Batch-Level Activity	Facility-Level Activity
A.	Direct materials	Plant depreciation
B.	Inspection	Property taxes
C.	Quality assurance	Shipping
D.	Plant maintenance	Insurance
E.	Management salaries	Material handling

    Answer: B LO: 3 Type: RC

15. The division of activities into unit-level, batch-level, product-sustaining level, and facility-level categories is commonly known as a cost:
    A. object.
    B. application method.
    C. hierarchy.
    D. estimation method.
    E. classification scheme that is useful in traditional, volume-based systems.

    Answer: C LO: 3 Type: RC

16. Alamo's customer service department follows up on customer complaints by telephone inquiry. During a recent period, the department initiated 7,000 calls and incurred costs of $203,000. If 2,940 of these calls were for the company's wholesale operation (the remainder were for the retail division), costs allocated to the retail division should amount to:
    A. $0.
    B. $29.
    C. $85,260.
    D. $117,740.
    E. $203,000.

    Answer: D LO: 4 Type: A

Use the following to answer questions 17-18:

Riverside Florists uses an activity-based costing system to compute the cost of making floral bouquets and delivering the bouquets to its commercial customers. Company personnel who earn $180,000 typically perform both tasks; other firm-wide overhead is expected to total $70,000. These costs are allocated as follows:

	Bouquet Production	Delivery	Other
Wages and salaries	60%	30%	10%
Other overhead	50%	35%	15%

Riverside anticipates making 20,000 bouquets and 4,000 deliveries in the upcoming year.

17. The cost of wages and salaries and other overhead that would be charged to each bouquet made is:
    A. $7.15.
    B. $8.75.
    C. $12.50.
    D. $13.75.
    E. some other amount.

    Answer: A LO: 4 Type: A

18. The cost of wages and salaries and other overhead that would be charged to each delivery is:
    A. $19.63.
    B. $20.31.
    C. $26.75.
    D. $40.63.
    E. some other amount.

    Answer: A LO: 4 Type: A

Use the following to answer questions 19-27:

HiTech Products manufactures three types of remote-control devices: Economy, Standard, and Deluxe. The company, which uses activity-based costing, has identified five activities (and related cost drivers). Each activity, its budgeted cost, and related cost driver is identified below.

Activity	Cost	Cost Driver
Material handling	$ 225,000	Number of parts
Material insertion	2,475,000	Number of parts
Automated machinery	840,000	Machine hours
Finishing	170,000	Direct labor hours
Packaging	170,000	Orders shipped
Total	$3,880,000	

The following information pertains to the three product lines for next year:

	Economy	Standard	Deluxe
Units to be produced	10,000	5,000	2,000
Orders to be shipped	1,000	500	200
Number of parts per unit	10	15	25
Machine hours per unit	1	3	5
Labor hours per unit	2	2	2

19. What is HiTech's cost application rate for the material-handling activity?
    A. $1.00 per part.
    B. $2.25 per part.
    C. $6.62 per labor hour.
    D. $13.23 per part.
    E. A rate other than those listed above.

    Answer: A LO: 4 Type: A

20. What is HiTech's cost application rate for the automated machinery activity?
    A. $24.00 per machine hour.
    B. $24.50 per labor hour.
    C. $49.42 per unit.
    D. $50.00 per machine hour.
    E. A rate other than those listed above.

    Answer: A LO: 4 Type: A

21. What is HiTech's cost application rate for the finishing activity?
    A. $5.00 per labor hour.
    B. $5.00 per machine hour.
    C. $5.00 per unit.
    D. $7.50 per unit.
    E. A rate other than those listed above.

    Answer: A LO: 4 Type: A

22. What is HiTech's cost application rate for the packaging activity?
    A. $4.86 per machine hour.
    B. $5.00 per labor hour.
    C. $10.00 per unit.
    D. $100.00 per order shipped.
    E. A rate other than those listed above.

    Answer: D LO: 4 Type: A

23. Under an activity-based costing system, what is the per-unit cost of Economy?
    A. $141.
    B. $164.
    C. $225.
    D. $228.
    E. An amount other than those listed above.

    Answer: B LO: 4 Type: A

24. Under an activity-based costing system, what is the per-unit cost of Standard?
    A. $164.
    B. $228.
    C. $272.
    D. $282.
    E. An amount other than those listed above.

    Answer: C LO: 4 Type: A

25. Under an activity-based costing system, what is the per-unit cost of Deluxe?
    A. $272.
    B. $282.
    C. $320.
    D. $440.
    E. An amount other than those listed above.

    Answer: D LO: 4 Type: A

26. Assume that HiTech is using a volume-based costing system, and the preceding manufacturing costs are applied to all products based on direct labor hours. How much of the preceding cost would be assigned to Deluxe?
    A. $456,471.
    B. $646,471.
    C. $961,176.
    D. $1,141,176.
    E. An amount other than those listed above.

    Answer: A LO: 1 Type: A

27. Assume that HiTech is using a volume-based costing system, and the preceding manufacturing costs are applied to all products based on direct labor hours. How much of the preceding cost would be assigned to Standard?
    A. $456,471.
    B. $646,471.
    C. $961,176.
    D. $1,141,176.
    E. An amount other than those listed above.

    Answer: D LO: 1 Type: A

Use the following to answer questions 28-31:

Century, Inc., currently uses traditional costing procedures, applying $400,000 of overhead to products X and Y on the basis of direct labor hours. The firm is considering a shift to activity-based costing and the creation of individual cost pools that will use direct labor hours (DLH), production setups (SU), and number of parts components (PC) as cost drivers. Data on the cost pools and respective driver volumes follow.

Product	Pool No. 1 (Driver: DLH)	Pool No. 2 (Driver: SU)	Pool No. 3 (Driver: PC)
X	600	30	1,500
Y	1,400	50	1,000
Pool Cost	$80,000	$140,000	$180,000

28. The overhead cost allocated to product X by using traditional costing procedures would be:
    A. $120,000.
    B. $184,500.
    C. $215,500.
    D. $280,000.
    E. some other amount.

    Answer: A LO: 1 Type: A

29. The overhead cost allocated to product Y by using traditional costing procedures would be:
    A. $120,000.
    B. $184,500.
    C. $215,500.
    D. $280,000.
    E. some other amount.

    Answer: D LO: 1 Type: A

30. The overhead cost allocated to product X by using activity-based costing procedures would be:
    A. $120,000.
    B. $184,500.
    C. $215,500.
    D. $280,000.
    E. some other amount.

    Answer: B LO: 4 Type: A

31. The overhead cost allocated to product Y by using activity-based costing procedures would be:
    A. $120,000.
    B. $184,500.
    C. $215,500.
    D. $280,000.
    E. some other amount.

    Answer: C LO: 4 Type: A

Use the following to answer questions 32-33:

Kelly and Logan, an accounting firm, provides consulting and tax planning services. A recent analysis found that 65% of the firm's billable hours to clients resulted from tax planning and for many years, the firm's total administrative cost (currently $250,000) has been allocated to services on this basis.

The firm, contemplating a change to activity-based costing, has identified three components of administrative cost, as follows:

Staff support	$180,000
In-house computing charges	50,000
Miscellaneous office costs	20,000
Total	$250,000

A recent analysis of staff support found a strong correlation with the number of clients served (consulting, 20; tax planning, 60). In contrast, in-house computing and miscellaneous office cost varied directly with the number of computer hours logged and number of client transactions, respectively. Consulting consumed 30% of the firm's computer hours and had 20% of the total client transactions.

32. Assuming the use of activity-based costing, the proper percentage to use in allocating staff support costs to tax planning services is:
    A. 20%.
    B. 60%.
    C. 65%.
    D. 75%.
    E. 80%.

    Answer: D LO: 4 Type: A

33. If Kelly and Logan switched from its current accounting method to an activity-based costing system, the amount of administrative cost chargeable to consulting services would:
    A. decrease by $23,500.
    B. increase by $23,500.
    C. decrease by $32,500.
    D. change by an amount other than those listed above.
    E. change, but the amount cannot be determined based on the information presented.

    Answer: A LO: 1, 4 Type: A

34. Activity-based costing systems:
    A. use a single, volume-based cost driver.
    B. assign overhead to products based on the products' relative usage of direct labor.
    C. often reveal products that were under- or overcosted by traditional costing systems.
    D. typically use fewer cost drivers than more traditional costing systems.
    E. have a tendency to distort product costs.

    Answer: C LO: 5 Type: RC

35. Dreyfus Manufacturing sells a number of goods whose selling price is heavily influenced by cost. A recent study of product no. 519 revealed a traditionally-derived total cost of $1,019, a selling price of $1,850 based on that figure, and a newly computed activity-based total cost of $1,215. Which of the following statements is true?
    A. All other things being equal, the company should consider a drop in its sales price.
    B. The company may have been extremely competitive in the marketplace from a price perspective.
    C. Product no. 519 could be labeled as being overcosted by the firm's traditional costing procedures.
    D. If product no. 519 is undercosted by traditional accounting procedures, then all of the company's other products must be undercosted as well.
    E. Generally speaking, the activity-based cost figure is “less accurate” than the traditionally-derived cost figure.

    Answer: B LO: 5 Type: N

36. Vanguard combines all manufacturing overhead into a single cost pool and allocates this overhead to products by using machine hours. Activity-based costing would likely show that with Vanguard's current procedures,
    A. all of the company's products are undercosted.
    B. the company's high-volume products are undercosted.
    C. all of the company's products are overcosted.
    D. the company's high-volume products are overcosted.
    E. the company's low-volume products are overcosted.

    Answer: D LO: 5 Type: N

37. Jackson manufactures products X and Y, applying overhead on the basis of labor hours. X, a low-volume product, requires a variety of complex manufacturing procedures. Y, on the other hand, is both a high-volume product and relatively simplistic in nature. What would an activity-based costing system likely disclose about products X and Y as a result of Jackson's current accounting procedures?

	X	Y
A.	Undercosted	Undercosted
B.	Undercosted	Overcosted
C.	Overcosted	Undercosted
D.	Overcosted	Overcosted
E.	Costed correctly	Costed correctly

Answer: B LO: 5 Type: RC

38. Koski manufactures products J and K, applying overhead on the basis of labor hours. J, a low-volume product, requires a variety of complex manufacturing procedures. K, on the other hand, is both a high-volume product and relatively simplistic in nature. What would an activity-based costing system likely disclose about products J and K as a result of Koski's current accounting procedures?

	Undercosted	Overcosted
A.	J, K	
B.		J, K
C.	J	K
D.	K	J

E. None of the above, as both products are costed correctly.

Answer: C LO: 5 Type: RC

39. Consider the following statements:

I. Product diversity creates costing problems because diverse products tend to utilize manufacturing activities in different ways.
II. Overhead costs that are not incurred at the unit level create costing problems because such costs do not vary with traditional application bases such as direct labor hours or machine hours.
III. Product diversity typically exists when a single product (e.g., a ballpoint pen) is made in different colors.

Which of the above statements is (are) true?
A. I only.
B. II only.
C. I and II.
D. I and III.
E. II and III.

Answer: C LO: 5 Type: RC

40. Consumption ratios are useful in determining:
    A. the existence of product-line diversity.
    B. overhead that is incurred at the unit level.
    C. if overhead-producing activities are being utilized effectively.
    D. if overhead costs are being applied to products.
    E. if overhead-producing activities are being utilized efficiently.

    Answer: A LO: 5 Type: RC

41. Widely varying consumption ratios:
    A. are reflective of product-line diversity.
    B. indicate an out-of-control production environment.
    C. dictate a need for traditional costing systems.
    D. work against the implementation of activity-based costing.
    E. create an unsolvable product-costing problem.

    Answer: A LO: 5 Type: RC

42. Moon Bay Manufacturing uses machine hours to apply manufacturing overhead to products. This method of costing would likely be acceptable if the company has:
    A. a large proportion of unit-level activities.
    B. a large proportion of unit-level activities and fairly identical consumption ratios among product lines.
    C. a large proportion of unit-level activities and widely varying consumption ratios among product lines.
    D. a large proportion of nonunit-level activities.
    E. a large proportion of nonunit-level activities and fairly identical consumption ratios among product lines.

    Answer: B LO: 5 Type: N

43. In comparison with a system that uses a single, volume-based cost driver, an activity-based costing system is preferred when a company has:
    A. a large proportion of nonunit-level activities.
    B. product-line diversity or a large proportion of nonunit-level activities.
    C. minimal product-line diversity and a small proportion of nonunit-level activities.
    D. existing variances from budgeted amounts.
    E. a situation other than those noted above.

    Answer: B LO: 5 Type: RC

44. Consider the following factors:

I. The degree of correlation between consumption of an activity and consumption of a particular cost driver.
II. The likelihood that a particular cost driver will induce a desired behavioral effect.
III. The likelihood that a particular cost driver will cause an increase in the cost of measurement.

Which of these factors should be considered in the selection of a cost driver?
A. I only.
B. I and II.
C. I and III.
D. II and III.
E. I, II, and III.

Answer: E LO: 6 Type: RC

45. Which of the following activity cost pools and activity measures likely has the lowest degree of correlation?

	Activity Cost Pool	Activity Measure
A.	Order department	Number of orders processed
B.	Sales management	Time spent by managers in each sales territory
C.	Accounts receivable processing	Number of customers
D.	Catering	Numbers of meals served
E.	Employee travel to job sites (sites are within 100-mile radius of company headquarters)	Number of employees

Answer: E LO: 6 Type: N

46. Grossman Enterprises is converting to an activity-based costing system and needs to depict the various activities in its manufacturing process along with the activities' relationships. Which of the following is a possible tool that the company can use to accomplish this task?
A. Storyboards.
B. Activity relationship charts (ARCs).
C. Decision trees.
D. Simulation games.
E. Process organizers.

Answer: A LO: 7 Type: RC

47. Successful adoptions of activity-based costing typically occur when companies rely heavily on:
    A. finance personnel.
    B. accounting personnel.
    C. manufacturing personnel.
    D. office personnel.
    E. multidisciplinary project teams.

    Answer: E LO: 7 Type: RC

48. Under a traditional costing system, which of the following costs would likely be classified as indirect with respect to the various products manufactured?
    A. Plant maintenance.
    B. Factory supplies.
    C. Utilities.
    D. Machinery depreciation.
    E. All of the above would be considered indirect costs.

    Answer: E LO: 7 Type: N

49. Williams Corporation is changing from a traditional costing system to an activity-based system. As a result of this action, which of the following costs would likely change from indirect to direct?
    A. Direct materials.
    B. Factory supplies.
    C. Production setup.
    D. Production setup and finished-goods inspection.
    E. Production setup, finished-goods inspection, and product shipping.

    Answer: E LO: 7 Type: N

50. Which of the following generally <u>fails</u> to signal the need for a new product-costing system?
    A. Line managers do not believe reported product costs.
    B. Complex products have high reported profitability despite the lack of premium prices.
    C. Overhead rates are high and increasing over time.
    D. Line managers suggest that seemingly profitable products be dropped.
    E. Product-line profit margins are easy to explain.

    Answer: E LO: 7 Type: RC

51. Of the following organizations, activity-based costing <u>cannot</u> be used by:
    A. manufacturers.
    B. financial-services firms.
    C. book publishers.
    D. hotels.
    E. none of the above, as all are able to use this costing system.

    Answer: E LO: 8 Type: RC

52. Which of the following statements about activity-based costing (ABC) is false?
    A. ABC cannot be used by service businesses.
    B. In comparison with traditional costing systems, ABC tends to use more cost pools and more cost drivers.
    C. In comparison with traditional-costing systems, ABC results in less cost "averaging" of various diversified activities.
    D. In comparison with traditional-costing systems, ABC results in more costs being classified as direct costs.
    E. ABC tends to reduce cost distortion among product lines.

    Answer: A LO: 8 Type: N

53. A hospital administrator is in the process of implementing an activity-based-costing system. Which of the following tasks would not be part of this process?
    A. Identification of cost pools.
    B. Calculation of cost application rates.
    C. Assignment of cost to services provided.
    D. Identification of cost drivers.
    E. None of the above, as all these tasks would be part of the process.

    Answer: E LO: 8 Type: RC

EXERCISES

Classification of Activities

54. St. Helena Cellars produces wine in northern California. Consider the following selected costs that arose during the current year:

    1. Safety costs at winery
    2. Truckload shipping costs
    3. Building maintenance costs
    4. Bottle and cork cost
    5. Development cost of new, after-dinner wine
    6. Tasting and testing costs

    Required:
    A. Briefly distinguish between unit-level and product-sustaining activities.
    B. Classify the six costs listed as arising from a unit-level, batch-level, product-sustaining, or facility-level activity.

    LO: 3 Type: RC, N

Answer:

A. A unit-level activity is performed for each unit of production. In contrast, a product-sustaining activity is needed to support an entire product line. The latter is not necessarily performed each time a new unit or batch of products is manufactured.

B. 1. Facility-level
2. Batch-level
3. Facility-level
4. Unit-level
5. Product-sustaining
6. Batch-level

Classification of Activities

55. Consider the following costs that relate to a bank and a manufacturer of software:

Bank

1. Review cost of commercial loan applications
2. Operating cost of human resources department
3. Immediate processing cost of a specific customer's cash deposit
4. Bank membership cost of joining local Chamber of Commerce

Software manufacturer

5. Label and packaging charges from a commercial printer for a new software release
6. Air conditioning/heating costs of the firm's production plant
7. Transport cost of moving the CD-output from production run no. 1 to the company's warehouse
8. Design, development, and coding cost of new spreadsheet software

Required:

A. Classify the eight costs listed as arising from either a unit-level, batch-level, product-sustaining, or facility-level activity.
B. Would number of loan applications or number of customers be a more appropriate cost-driver base for the review of loan applications? Briefly explain.

LO: 3, 6 Type: RC, N

Answer:

A. 1. Unit-level
2. Facility-level
3. Unit-level
4. Facility-level
5. Product-sustaining
6. Facility-level
7. Batch-level
8. Product-sustaining

B. The number of loan applications would be more appropriate because it has a higher correlation with the amount of review cost incurred. Applications create review cost; customers, on the other hand, may not.

Classification of Activities

56. Alexander Corporation produces flat-screen computer monitors. Consider the following selected costs that arose during the current year:

    1. Direct materials used: $3,640,000
    2. Plant rent, utilities, and taxes: $1,229,000
    3. New technology design engineering: $2,040,000
    4. Materials receiving: $318,000
    5. Manufacturing-run/set-up charges: $115,000
    6. Equipment depreciation: $92,000
    7. General management salaries: $1,564,000

    Required:
    A. Briefly distinguish between batch-level and facility-level activities.
    B. Determine the cost of the firm's unit-level, batch-level, product-sustaining, and facility-level activities.

    LO: 3 Type: RC, N, A

    Answer:
    A. A batch-level activity is performed for each batch of products rather than for each unit. In contrast, a facility-level activity is required for an entire process to occur. Examples of the latter, which support the organization as a whole, include plant maintenance and property taxes.

    B. Unit-level: $3,640,000 (1)
    Batch-level: $318,000 (4) + $115,000 (5) = $433,000
    Product-sustaining: $2,040,000 (3)
    Facility-level: $1,229,000 (2) + $92,000 (6) + $1,564,000 (7) = $2,885,000

Activity-Based Costing, Traditional Costing

57. The controller for Wolfe Machining has established the following overhead cost pools and cost drivers:

Overhead Cost Pool	Budgeted Overhead Cost	Cost Driver
Machine setups	$240,000	Number of setups
Material handling	90,000	Units of raw material
Quality control inspection	48,000	Number of inspections
Other overhead costs	160,000	Machine hours
Total	$538,000	

Overhead Cost Pool	Budgeted Level for Cost Driver	Overhead Rate
Machine setups	200 setups	$1,200 per setup
Material handling	60,000 units	$1.50 per unit
Quality control	1,200 inspections	$40 per inspection
Other overhead	20,000 machine hours	$8 per machine hour

Order no. 715 has the following production requirements:

Machine setups: 7
Raw material: 11,200 units
Inspections: 16
Machine hours: 850

Required:

A. Compute the total overhead that should be assigned to order no. 715 by using activity-based costing.
B. Suppose that Wolfe were to use a single, predetermined overhead rate based on machine hours. Compute the rate per hour and the total overhead assigned to order no. 715.
C. Discuss the merits of an activity-based costing system in comparison with a traditional costing system.

LO: 1, 4, 5 Type: A, N

Answer:

A.

Overhead Cost Pool	Predetermined Overhead Rate	Level of Cost Driver	Cost
Machine setups	$1,200 per setup	7 setups	$ 8,400
Material handling	$1.50 per unit	11,200 units	16,800
Quality control	$40 per inspection	16 inspections	640
Other overhead costs	$8 per machine hour	850 machine hours	6,800
Total			$32,640

B $538,000 ÷ 20,000 machine hours = $26.90 per hour;
$26.90 per hour x 850 hours = $22,865

C. Activity-based costing (ABC) uses multiple cost drivers, more closely aligning individual costs with the factors that are creating them. Traditional systems, in contrast, use fewer drivers and therefore result in "lumping" of unlike activities together. The end result is that ABC tends to eliminate the cost distortion that sometimes arises with traditional systems, more specifically, the under- or overcosting of products.

Activity-Based Costing: Cost Distortion

58. Academy Enterprises uses a traditional-costing system to estimate quality-control costs for its PDA product line. Costs are estimated at 32% of direct-labor cost, and direct labor totaled $548,000 for the quarter just ended. Management is contemplating a change to activity-based costing, and has established three cost pools: incoming material inspection, in-process inspection, and final product certification. Number of parts, number of units, and number of orders have been selected as the respective cost drivers.

The following data show the application rates that have been calculated by the company along with the quantity of driver units for the PDAs:

Cost Application Rate	Driver Quantities
$ 0.50 per part	14 parts
0.10 per unit	26,000 units
110.00 per order	80 orders

Required:

A. Calculate the quarterly quality-control cost that is allocated to the PDA product line under Academy's traditional-costing system.
B. Calculate the quarterly quality-control cost that is allocated to the PDAs if activity-based costing used.
C. Does the traditional approach under- or overcost the product line? By how much?

LO: 1, 4, 5 Type: A, N

Answer:

A. $548,000 x 32% = $175,360

B. Incoming inspection ($0.50 x 14 x 26,000 = $182,000) + in-process inspection (26,000 x $0.10 = $2,600) + final certification (80 x $110 = $8,800), which totals $193,400.

C. Traditional costing undercosts the PDAs by $18,040 ($193,400 - $175,360).

Activity-Based Costing: Qualitative Emphasis

59. Star Manufacturing, contemplating the adoption of an activity-based costing system, has established three activity-cost pools: machine setup, quality assurance, and engineering. These cost pools, the appropriate cost driver, and the percentage of each cost driver consumed by the company's products (H15, H16, and H17) follow.

Cost Pool	Cost Driver	H15	H16	H17
Machine setup	Number of setups	50%	20%	30%
Quality assurance	Number of inspections	70%	15%	15%
Engineering	Number of change orders	15%	10%	75%

Estimated costs for these three activities, which account for 80% of the firm's total overhead, are $400,000, $500,000, and $120,000, respectively. Star currently applies manufacturing overhead to products on the basis of machine hours.

Required:

A. Will activity-based costing systems require more or fewer cost pools than traditional costing systems? No explanation is necessary.
B. Calculate the cost of machine setup, quality assurance, and engineering to be charged to product H17.
C. Consider the company's current overhead application procedure.
   1. Is Star emphasizing unit-level activities, batch-level activities, product-sustaining activities, or facility-level activities? Explain.
   2. How accurate will the current costing procedure be given the nature of most of the company's activities? Briefly discuss.
   3. How accurate will the current costing procedure be given the consumption ratios of the firm? Briefly discuss.

LO: 1, 3, 4, 5 Type: A, N

Answer:

A. More

B. Machine setup: $400,000 x 30% = $120,000
Quality assurance: $500,000 x 15% = $75,000
Engineering: $120,000 x 75% = $90,000

C. 1. The company currently applies overhead on the basis of machine hours, therefore emphasizing unit-level activities. Machine hours are consumed for each unit produced.

2. The current procedure is probably not very accurate. The majority of Star's overhead (80%) is created by setups, inspections, and engineering change orders, not machine hours. In this case, for instance, setups and (likely) inspection are really batch-level activities whereas engineering costs are caused by product-sustaining activities.

3. The consumption ratios vary extensively from one product to the next, thus indicating product diversity. The use of a single driver (machine hours in this case) will not recognize this diversity and will give rise to cost distortion.

Activity-Based Costing: Analysis Emphasis

60. Kenyon Company produces two products (F56 and F57), applying manufacturing overhead on the basis of direct labor hours. Anticipated unit production costs (material, labor, and overhead) and manufacturing volumes are:

F56: 2,000 units, $234
F57: 3,500 units, $271

Kenyon's overhead arises because of various activities, one of which is purchase-order processing. Budgeted cost for this activity is expected to be $70,000. The firm believes that the number of purchase orders processed is a key cost driver and expects the following activity for its products: F56, 10 purchase orders; F57, 40 purchase orders. Kenyon's selling prices are based heavily on cost.

Required:

A. Activity-based costing (ABC) is said to result in improved costing accuracy when compared with traditional costing procedures. Briefly explain how this improved accuracy is attained.
B. Compute:
   1. the pool application rate for purchase-order processing.
   2. the purchase-order processing cost to be charged to one unit of F56.
C. Assume that Kenyon switched to activity-based costing and calculated total unit production costs as follows: F56, $285; F57, $220.
   1. Which of the two products, F56 or F57, was overcosted prior to the change to ABC? No explanation is necessary.
   2. Which of the two products, F56 or F57, may have been less competitive in the marketplace prior to the change to ABC? Briefly explain.

LO: 1, 4, 5 Type: A, N

Answer:

A. Activity-based costing (ABC) uses multiple cost drivers, more closely aligning individual costs with the factors that are creating them. Traditional systems, in contrast, use fewer drivers and therefore result in "lumping" of unlike activities (unit-level, batch-level, and so forth) together. The end result is that ABC tends to eliminate the cost distortion that sometimes arises with traditional systems, more specifically, the under- or overcosting of products. Additionally, the use of multiple cost drivers allows users to better consider variations in consumption ratios that may exist among product lines.

B. 1. $70,000 ÷ (10 + 40) = $1,400 per order
2. $1,400 x 10 = $14,000; $14,000 ÷ 2,000 units = $7

C. 1. F57 (traditional, $271 vs. ABC, $220)
2. F57. Kenyon's selling prices are based heavily on cost. An overcosted product will result in a higher selling price, which may make the company less competitive.

Activity-Based Costing: Analysis Emphasis

61. Lennox Industries manufactures two products: A and B. A review of the company's accounting records revealed the following per-unit costs and production volumes:

	A	B
Production volume (units)	2,500	5,000
Direct material	$ 40	$ 60
Direct labor:		
2 hours at $12	24	
3 hours at $12		36
Manufacturing overhead:		
2 hours at $93	186	
3 hours at $93		279

Manufacturing overhead is currently computed by spreading overhead of $1,860,000 over 20,000 direct labor hours. Management is considering a shift to activity-based costing in an effort to improve the firm's accounting procedures, and the following data are available:

			Cost Driver Volume		
Cost Pool	Cost	Cost Driver	A	B	Total
Setups	$ 240,000	Number of setups	100	20	120
General factory	1,500,000	Direct labor hours	5,000	15,000	20,000
Machine processing	120,000	Machine hours	2,200	800	3,000
	$1,860,000				

Lennox determines selling prices by adding 40% to a product's total cost.

Required:

A. Compute the per-unit cost and selling price of product B by using Lennox's current costing procedures.
B. Compute B's per-unit overhead cost of product B if the company switches to activity-based costing.
C. Compute the total per-unit cost and selling price under activity-based costing.
D. Lennox has recently encountered significant international competition for product B, with considerable business being lost to very aggressive suppliers. Will activity-based costing allow the company to be more competitive with product B from a price perspective? Briefly explain.
E. Will the cost and selling price of product A likely increase or decrease if Lennox changes to activity-based costing? Why? Hint: No calculations are necessary.

LO: 1, 4, 5 Type: A, N

Answer:

A.

Direct material	$ 60
Direct labor	36
Manufacturing overhead	279
Per-unit cost	$375
Markup ($375 x 40%)	150
Selling price	$525

B. Setups: $240,000 ÷ 120 setups = $2,000 per setup
General factory: $1,500,000 ÷ 20,000 direct labor hours = $75 per direct labor hour
Machine processing: $120,000 ÷ 3,000 machine hours = $40 per machine hour

Overhead cost for product B:

Setups: 20 setups x $2,000	$ 40,000
General factory: 15,000 labor hours x $75	1,125,000
Machine processing: 800 machine hours x $40	32,000
Total	$1,197,000

Overhead per unit: $1,197,000 ÷ 5,000 units = $239.40

C.

Direct material	$ 60.00
Direct labor	36.00
Manufacturing overhead	239.40
Per-unit cost	$335.40
Markup ($335.40 x 40%)	134.16
Selling price	$469.56

D. Yes. The switch to activity-based costing results in a lower cost being assigned to product B ($335.40 vs. $375) and thus a lower selling price.
E. Because less overhead cost is assigned to product B under activity-based costing, more will be assigned to product A. A higher cost translates into a higher selling price.

Activity-Based and Traditional Costing; Cost Distortion

62. Scott, Inc., manufactures two products, Regular and Deluxe, and applies overhead on the basis of direct labor hours. Anticipated overhead and direct labor time for the upcoming accounting period are $1,600,000 and 25,000 hours, respectively. Information about the company's products follows.

Regular—
Estimated production volume: 3,000 units
Direct materials cost: $28 per unit
Direct labor per unit: 3 hours at $15 per hour

Deluxe—
Estimated production volume: 4,000 units
Direct materials cost: $42 per unit
Direct labor per unit: 4 hours at $15 per hour

Scott's overhead of $1,600,000 can be identified with three major activities: order processing ($250,000), machine processing ($1,200,000), and product inspection ($150,000). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. Data relevant to these activities follow.

	Orders Processed	Machine Hours Worked	Inspection Hours
Regular	320	16,000	4,000
Deluxe	180	24,000	6,000
Total	500	40,000	10,000

Required:

A. Compute the application rates that would be used for order processing, machine processing, and product inspection in an activity-based costing system.
B. Assuming use of activity-based costing, compute the unit manufacturing costs of Regular and Deluxe if the expected manufacturing volume is attained.
C. How much overhead would be applied to a unit of Regular and Deluxe if the company used traditional costing and applied overhead solely on the basis of direct labor hours? Which of the two products would be undercosted by this procedure? Overcosted?

LO: 1, 4, 5 Type: A, N

Answer:

A. Order processing: $250,000 ÷ 500 orders processed (OP) = $500 per OP
Machine processing: $1,200,000 ÷ 40,000 machine hours (MH) = $30 per MH
Product inspection: $150,000 ÷ 10,000 inspection hours (IH) = $15 per IH

B.

Activity	Regular	Deluxe
Order processing:		
320 OP x $500	$160,000	
180 OP x $500		$ 90,000
Machine processing:		
16,000 MH x $30	480,000	
24,000 MH x $30		720,000
Product inspection:		
4,000 IH x $15	60,000	
6,000 IH x $15		90,000
Total	$700,000	$900,000
Production volume (units)	3,000	4,000
Cost per unit	$233.33*	$225.00**

* $700,000 ÷ 3,000 units = $233.33
**$900,000 ÷ 4,000 units = $225.00

The cost of a Regular unit is $306.33, and the cost of a Deluxe unit is $327.00:

	Regular	Deluxe
Direct materials	$ 28.00	$ 42.00
Direct labor:		
3 hours x $15	45.00	
4 hours x $15		60.00
Order processing, machine processing, and inspection	233.33	225.00
Total cost	$306.33	$327.00

C. Overhead rate: $1,600,000 ÷ 25,000 direct labor hours (DLH) = $64 per DLH
Regular: 3 hours x $64 = $192
Deluxe: 4 hours x $64 = $256

Regular is undercosted by this procedure, as the more accurate ABC figure is $233.33. In contrast, Deluxe is overcosted because the ABC figure for overhead amounts to only $225.

Activity-Based and Traditional Costing; Price Change

63. Pitney Corporation manufactures two types of transponders—no. 156 and no. 157—and applies manufacturing overhead to all units at the rate of $76.50 per machine hour. Production information follows.

	No. 156	No. 157
Anticipated volume (units)	6,000	14,000
Direct material cost	$40	$65
Direct labor cost	25	25

The controller, who is studying the use of activity-based costing, has determined that the firm's overhead can be identified with three activities: manufacturing setups, machine processing, and product shipping. Data on the number of setups, machine hours worked, and outgoing shipments, the activities' three respective cost drivers, follow.

	No. 156	No. 157	Total
Setups	60	40	100
Machine hours worked	15,000	25,000	40,000
Outgoing shipments	120	80	200

The firm's total overhead of $3,060,000 is subdivided as follows: manufacturing setups, $260,000; machine processing, $2,400,000; and product shipping, $400,000.

Required:

A. Compute the application rates that would be used for manufacturing setups, machine processing, and product shipping in an activity-based costing system.
B. Assuming use of activity-based costing, compute the unit overhead costs of product nos. 156 and 157 if the expected manufacturing volume is attained.
C. Assuming use of activity-based costing, compute the total cost per unit of product no. 156.
D. If the company's selling price is based heavily on cost, would a switch to activity-based costing from the current traditional system result in a price increase or decrease for product no. 156? Show computations.

LO: 1, 4, 5 Type: A, N

Answer:

A. Manufacturing setups: $260,000 ÷ 100 setups (SU) = $2,600 per SU
Machine processing: $2,400,000 ÷ 40,000 machine hours (MH) = $60 per MH
Product shipping: $400,000 ÷ 200 outgoing shipments (OS) = $2,000 per OS

B.

Activity	No. 156	No. 157
Manufacturing setup:		
60 SU x $2,600	$ 156,000	
40 SU x $2,600		$ 104,000
Machine processing:		
15,000 MH x $60	900,000	
25,000 MH x $60		1,500,000
Product shipping:		
120 OS x $2,000	240,000	
80 OS x $2,000		160,000
Total	$1,296,000	$1,764,000
Production volume (units)	6,000	14,000
Cost per unit	$216*	$126**

* $1,296,000 ÷ 6,000 units = $216
**$1,764,000 ÷ 14,000 units = $126

C. Direct material ($40) + direct labor ($25) + overhead ($216) = $281

D. Machine hours (15,000) ÷ units produced (6,000) = 2.5 hours per unit;
2.5 hours x $76.50 = $191.25 overhead applied

Direct material ($40.00) + direct labor ($25.00) + overhead ($191.25) = $256.25

Product no. 156 is currently undercosted ($256.25 vs. $281.00), so a switch to activity-based costing will likely result in a price hike.

Activity-Based Costing: Service Application

64. Heartland Bank & Trust operates in a very competitive marketplace, using a traditional labor-hour-based system to determine the cost of processing its mortgage loans. Recently, the firm explored a switch to activity-based costing to determine the accuracy of its previous ways. The following information is available:

Activity	Cost	Driver	Driver Units
Application processing	$ 900,000	Applications	4,000
Loan underwriting	800,000	Underwriting hours	16,000
Loan closure	880,000	Legal hours	8,000
Total	$2,580,000		

Two loan applications were originated and closed during the year. No. 7439 consumed 3.5 hours in loan underwriting and 1.5 hours in loan closure, for a total of 5.0 hours. No. 7809 also required 5.0 hours of time, subdivided as follows: 2.0 hours in loan underwriting and 3.0 hours in loan closure.

Required:

A. Use an activity-based-costing system and determine the cost of processing, underwriting, and closing the two loan applications.
B. Determine the cost of processing the two loans if Heartland uses the traditional labor-hour-based system. Conversations with management found that, on average, each application took nine labor hours of processing time, excluding underwriting and closure.
C. Is Heartland making a mistake by continuing to use a traditional system that is based on an average labor cost per hour? Why?

LO: 5, 8 Type: A, N

Answer:

A. Cost pool rates:
   Application processing: $900,000 ÷ 4,000 = $225 per application
   Loan underwriting: $800,000 ÷ 16,000 = $50 per underwriting hour
   Loan closure: $880,000 ÷ 8,000 = $110 per legal hour

   Application no. 7439: Application ($225) + underwriting (3.5 x $50 = $175) + closure (1.5 x $110 = $165) = $565
   Application no. 7809: Application ($225) + underwriting (2.0 x $50 = $100) + closure (3.0 x $110 = $330) = $655

B. Total labor hours: Application processing (4,000 x 9 = 36,000) + underwriting (16,000) + closure (8,000) = 60,000
   Average rate per hour: $2,580,000 ÷ 60,000 = $43 per hour
   Application no. 7439: (9 + 5) x $43 = $602
   Application no. 7809: (9 + 5) x $43 = $602

C. Yes. The traditional system results in an average cost per hour of $43; yet, Heartland's hourly charges vary greatly based on the function being performed. Rates range from $25 per hour ($225 ÷ 9) for application processing, to $50 per hour for underwriting, to $110 for legal services. ABC produces a more accurate determination of cost because three separate drivers are used rather than just one.

DISCUSSION QUESTIONS

An Overview of Activity-Based Costing

65. Templeton Industries currently assigns overhead to products by using a predetermined rate based on direct labor hours. The company is considering the adoption of an activity-based costing (ABC) system, and management desires a brief overview of this system before it makes a final decision.

    Compare ABC with the company's current system, focusing on the number of cost pools and cost drivers, costing accuracy, and cost distortion.

LO: 1, 2 Type: RC

Answer:
Templeton is currently combining all overhead into a single cost pool, to be applied to products by using a single cost driver (direct labor hours). Such a practice results in the calculation of an "average" cost because various cost relationships are being commingled. With ABC, cost pools are created for a company's individual activities, and a cost driver is then selected for each activity—a driver that has a high degree of correlation with the activity's consumption. The result is an increase in the number of cost pools and cost drivers when compared with current accounting procedures.

The abandonment of "average" costing leads to an improvement in costing accuracy and less cost distortion among a company's products. More specifically, product diversity and use of nonunit-level activities are now taken into account.

Effect of Environment on Product-Costing System

66. At a recent professional meeting, two controllers discussed product-costing problems in their respective companies. Both controllers are familiar with ABC systems, but neither of their firms utilizes such a system.

Controller D reported that part of the problem in his firm results from major differences among product lines with respect to unit volume, utilization of activities, quality assurance requirements established by customers, and product size. Controller M noted that in her firm, which manufactures consumer goods, all items undergo the same basic production processes in the same sequence. However, lately there has been a significant increase in the number of item colors.

Both controllers are worried about the potential distortion of product costs under their traditional product-costing systems.

Required:
Which controller should be more concerned about the potential distortion? Explain.

LO: 5 Type: RC, N

Answer:
Controller D should be more concerned. The variety of product lines made in his firm's facility reflects diversity at the product-line and cost levels. In Controller M's firm, there still is only one product line, with an increasing number of models differentiated only by color. (In many applications, there is no or very little cost difference among color choices.) Thus, D's firm may be the victim of cost distortion and a prime candidate for activity-based costing.

Cost Drivers

67. Define the term "cost driver" and discuss the factors that are important in the selection of appropriate cost drivers.

    LO: 6 Type: RC

    Answer:
    A cost driver is an event or activity that results in the incurrence of costs. For example, many of the costs in an automated environment are created by the operation of machines, and machine hours may be a suitable cost driver for overhead application.

    The first factor important in the selection of cost drivers is the degree of correlation (i.e., relationship) among the driver, the activity, and the cost. This relationship is crucial to achieve credibility and accuracy. Another factor is the cost of measurement. Cost/benefit tradeoffs must be taken into account. The system should contain drivers that identify key costs but if too many drivers are used, the system will be burdensome and expensive. Behavioral effects must also be considered in identifying cost drivers. Such effects may influence the behavior of decision makers, which could be good or bad depending on the outcome.