Chapter 18: Allocation of Support Activity Costs and Joint Costs

MULTIPLE CHOICE QUESTIONS

1. Which of the following would be considered a service department for an airline?
   A. Maintenance.
   B. Information Systems.
   C. Purchasing.
   D. Flight Catering.
   E. All of the above.

   Answer: E LO: 1 Type: N

2. Which of the following would not be considered a service department in a hospital?
   A. Security.
   B. Cardiac Care.
   C. Patient Records.
   D. Accounting.
   E. Human Resources.

   Answer: B LO: 1 Type: RC

3. Consider the following statements about service department costs:

   I. The costs of the Human Resources Department in a manufacturing organization must be allocated to production departments in order to achieve a correct costing of inventory.
   II. The allocation of service department costs requires that an organization select both an allocation base and an allocation method.
   III. Service department cost allocations are more relevant for firms involved in service industries (e.g., repair, health care) than for those involved with manufacturing.

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

   Answer: C LO: 1 Type: RC, N

4. Which of the following methods ignores the fact that some service departments provide service to other service departments?
   A. Direct method.
   B. Indirect method.
   C. Step-down method.
   D. Reciprocal method.
   E. Dual-cost allocation method.

   Answer: A LO: 1 Type: RC

5. Consider the following statements about the direct method of service department cost allocation:

   I. Under the direct method, all service department costs are eventually allocated to production departments.
   II. The order in which service department costs are allocated to production departments is important.
   III. Once a service department's costs have been allocated, no costs are re-circulated back to that department.

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

   Answer: D LO: 1 Type: RC

6. The Milrose Clinic has two service departments (Human Resources and Information Resources) and two "production" departments (In-patient Treatment and Out-patient Treatment). The service departments service each other, and studies have shown that Information Resources provides the greater amount of service. Which of the following allocations would occur if Milrose uses the direct method of cost allocation?
   A. Information Resources cost would be allocated to In-patient Treatment.
   B. Information Resources cost would be allocated to Human Resources.
   C. Human Resources cost would be allocated to Information Resources.
   D. In-patient Treatment cost would be allocated to Out-patient Treatment.
   E. Out-patient Treatment cost would be allocated to Information Resources.

   Answer: A LO: 1 Type: N

7. Trackster Corporation has two service departments (Maintenance and Human Resources) and three production departments (Machining, Assembly, and Finishing). Maintenance is the largest service department and Assembly is the largest production department. The two service departments service each other as well as the three producing departments. On the basis of this information, which of the following cost allocations would not occur under the direct method?
   A. Machining cost would be allocated to Assembly.
   B. Maintenance cost would be allocated to Finishing.
   C. Maintenance cost would be allocated to Human Resources.
   D. Human Resources cost would be allocated to Finishing.
   E. Allocations "A" and "C" would not occur.

   Answer: E LO: 1 Type: N

8. Which of the following methods recognizes some (but not all) of the services that occur between service departments?
   A. Direct method.
   B. Step-down method.
   C. Indirect method.
   D. Reciprocal method.
   E. Dual-cost allocation method.

   Answer: B LO: 1 Type: RC

9. When the step-down method is used, the service department whose costs are allocated first is often the department that:
   A. obtains the highest yield.
   B. has the lowest cost.
   C. is the newest.
   D. serves the greatest number of other service departments.
   E. serves the fewest other service departments.

   Answer: D LO: 1 Type: RC

10. Consider the following statements about the step-down method of service department cost allocation:

    I. Under the step-down method, all service department costs are eventually allocated to production departments.
    II. The order in which service department costs are allocated is important.
    III. Once a service department's costs have been allocated, no costs are re-circulated back to that department.

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

    Answer: E LO: 1 Type: RC

11. Duluth Corporation has two service departments (Maintenance and Human Resources) and three production departments (Machining, Assembly, and Finishing). The two service departments service each other, and studies have shown that Maintenance provides the greatest amount of service. On the basis of this information, which of the following cost allocations would likely occur under the step-down method?
    A. Machining cost would be allocated to Assembly.
    B. Maintenance cost would be allocated to Finishing.
    C. Maintenance cost would be allocated to Human Resources.
    D. Human Resources cost would be allocated to Maintenance.
    E. Allocations "B" and "C" above.

    Answer: E LO: 1 Type: N

12. The Hopwood Clinic has two service departments (Human Resources and Information Systems) and two "production" departments (In-patient Treatment and Out-patient Treatment). The service departments service each other, and studies have shown that Information Systems provides the greatest amount of service. Which of the following allocations would <u>not</u> occur if Hopwood uses the step-down method of cost allocation?
    A. Information Systems cost would be allocated to Human Resources.
    B. Human Resources cost would be allocated to Information Systems.
    C. Human Resources cost would be allocated to In-patient Treatment.
    D. In-patient Treatment cost would be allocated to Out-patient Treatment.
    E. Allocations "B" and "D" above.

    Answer: E LO: 1 Type: N

13. Which of the following methods accounts for 100% of the services that occur between service departments?
    A. Direct method.
    B. Indirect method.
    C. Reciprocal method.
    D. Step-down method.
    E. Dual-cost allocation method.

    Answer: C LO: 1, 6 Type: RC

14. Reno Corporation has two service departments (Maintenance and Human Resources) and three production departments (Machining, Assembly, and Finishing). The two service departments service each other, and studies have shown that Maintenance provides the greatest amount of service. Given the various cost allocation methods, which of the following choices correctly denotes whether Maintenance cost would be allocated to Human Resources?

	Direct	Step-Down	Reciprocal
A.	Yes	No	Yes
B.	Yes	No	No
C.	Yes	Yes	Yes
D.	No	Yes	No
E.	No	Yes	Yes

    Answer: E LO: 1, 6 Type: N

15. Which of the following methods would be of little use when allocating service department costs to production departments?
    A. The direct method.
    B. The reciprocal method.
    C. The step-down method.
    D. The net-realizable-value method.
    E. The dual-cost allocation method.

    Answer: D LO: 1, 2, 4 Type: N

16. Ryan, Inc., has two service departments (Human Resources and Building Maintenance) and two production departments (Machining and Assembly). The company allocates Building Maintenance cost on the basis of square footage and believes that Building Maintenance provides more service than Human Resources. The square footage occupied by each department follows.

Human Resources	4,000
Building Maintenance	11,000
Machining	16,000
Assembly	22,000

    Assuming use of the direct method, over how many square feet would the Building Maintenance cost be allocated (i.e., spread)?
    A. 15,000.
    B. 38,000.
    C. 42,000.
    D. 53,000.
    E. More information is needed to judge.

    Answer: B LO: 1 Type: A

17. Peterson Company has two service departments (Cafeteria and Human Resources) and two production departments (Machining and Assembly). The number of employees in each department follows.

Cafeteria	40
Human Resources	60
Machining	200
Assembly	300

Peterson uses the direct method of cost allocation and allocates cost on the basis of employees. If Human Resources cost amounts to $1,800,000, how much of the department's cost would be allocated to Machining?
A. $600,000.
B. $720,000.
C. $900,000.
D. $1,200,000.
E. Some other amount.

Answer: B LO: 1 Type: A

18. Durango, Inc., has two service departments (Human Resources and Building Maintenance) and two production departments (Machining and Assembly). The company allocates Building Maintenance cost on the basis of square footage and believes that Building Maintenance provides more service than Human Resources. The square footage occupied by each department follows.

Human Resources	5,000
Building Maintenance	9,000
Machining	15,000
Assembly	22,000

Assuming use of the step-down method, over how many square feet would the Building Maintenance cost be allocated (i.e., spread)?
A. 14,000.
B. 37,000.
C. 42,000.
D. 51,000.
E. More information is needed to judge.

Answer: C LO: 1 Type: A

19. Anniston, Inc., has two service departments (Human Resources and Building Maintenance) and two production departments (Machining and Assembly). The company allocates Building Maintenance cost on the basis of square footage and Human Resources cost on the basis of employees, and believes that Building Maintenance provides more service than Human Resources. The square footage and employees in each department follow.

	Square Footage	Employees
Human Resources	4,000	10
Building Maintenance	10,000	15
Machining	15,000	40
Assembly	21,000	60

Assuming use of the step-down method, which of the following choices correctly denotes the number of square feet and employees over which the Building Maintenance cost and Human Resources cost would be allocated (i.e., spread)?

	Building Maintenance	Human Resources
A.	36,000	100
B.	40,000	100
C.	46,000	110
D.	50,000	110
E.	Some other combination of figures not listed above.	

Answer: B LO: 1 Type: A

20. Western, Inc., has two service departments (Human Resources and Building Maintenance) and two production departments (Machining and Assembly). The company allocates Building Maintenance cost on the basis of square footage and believes that Building Maintenance provides more service than Human Resources. The square footage occupied by each department follows.

Human Resources	3,500
Building Maintenance	8,700
Machining	9,900
Assembly	15,000

Over how many square feet would the Building Maintenance cost be allocated (i.e., spread) with the direct method and the step-down method?

	Direct Method	Step-Down Method
A.	24,900	28,400
B.	24,900	37,100
C.	28,400	24,900
D.	37,100	24,900
E.	Some other combination of figures not listed above.	

Answer: A LO: 1 Type: A

21. Saunders Company has two service departments (Cafeteria and Human Resources) and two production departments (Machining and Assembly). The number of employees in each department follows.

Cafeteria	20
Human Resources	30
Machining	100
Assembly	150

Saunders uses the step-down method of cost allocation and allocates cost on the basis of employees. Human Resources cost amounts to $1,200,000, and the department provides more service to the firm than Cafeteria. How much Human Resources cost would be allocated to Machining?

A. $0.
B. $428,572.
C. $444,444.
D. $480,000.
E. Some other amount.

Answer: C LO: 1 Type: A

22. Hunt Corporation has two service departments (S1 and S2) and two production departments (P1 and P2), and uses the step-down method of cost allocation. Management has determined that S1 provides more service to the firm than S2, and has decided that the number of employees is the best allocation base to use for S1. The following data are available:

Department	Number of Employees
S1	10
S2	20
P1	50
P2	70

Which of the following statements is (are) true if S1 and S2 have respective operating costs of $280,000 and $350,000?

A. S2 should allocate a portion of its $350,000 cost to S1.
B. S1's cost should be allocated (i.e., spread) over 140 employees.
C. S1's cost should be allocated (i.e., spread) over 150 employees.
D. S2 should allocate a total of $390,000 to P1 and P2.
E. Statements "B" and "D" are both correct.

Answer: E LO: 1 Type: A

Use the following to answer questions 23-25:

The Dollar Store has a Human Resources Department and a Janitorial Department that provide service to three sales departments. The Human Resources Department cost is allocated on the basis of employees, and the Janitorial Department cost is allocated on the basis of space. The following information is available:

	Human Resources	Janitorial	Sales #1	Sales #2	Sales #3
Budgeted cost	$45,000	$30,000			
Space in square feet	4,000	1,000	20,000	30,000	50,000
Number of employees	5	10	15	45	30

23. Using the direct method, the amount of Janitorial Department cost allocated to Sales Department no. 2 is:
    A. $8,571.
    B. $8,654.
    C. $9,000.
    D. $10,350.
    E. $14,210.

    Answer: C LO: 1 Type: A

24. Using the step-down method and assuming that Human Resources is allocated first, the amount of Human Resources cost allocated to Sales Department no. 3 is:
    A. $12,000.
    B. $12,857.
    C. $13,500.
    D. $15,000.
    E. $22,500.

    Answer: C LO: 1 Type: A

25. Using the step-down method and assuming Human Resources is allocated first, the amount of Janitorial cost allocated to Sales Department no. 2 is:
    A. $8,571.
    B. $9,000.
    C. $9,857.
    D. $10,247.
    E. $10,350.

    Answer: E LO: 1 Type: A

Use the following to answer questions 26-28:

The Dexter Manufacturing Company has two production departments (Assembly and Finishing) and two service departments (Human Resources and Janitorial). The projected usage of the two service departments is as follows:

	Use of Human Resources	Use of Janitorial
Human Resources	---	5%
Janitorial	10%	---
Assembly	60%	40%
Finishing	30%	55%

The budgeted costs in the service departments are: Human Resources, $90,000 and Janitorial, $50,000.

26. Using the direct method, the amount of Janitorial Department cost allocated to the Finishing Department is:
    A. $21,053.
    B. $24,843.
    C. $25,000.
    D. $28,947.
    E. $34,157.

    Answer: D LO: 1 Type: A

27. Using the step-down method and assuming the Human Resources Department is allocated first, the amount of Human Resources cost allocated to the Assembly Department is:
    A. $21,053.
    B. $28,947.
    C. $54,000.
    D. $60,000.
    E. $78,842.

    Answer: C LO: 1 Type: A

28. Using the step-down method and assuming the Human Resources Department is allocated first, the total amount of service department cost allocated to the Finishing Department is:
    A. $58,947.
    B. $61,158.
    C. $74,000.
    D. $78,842.
    E. $81,053.

    Answer: B LO: 1 Type: A

29. The process of allocating fixed and variable costs separately is called:
    A. the separate allocation procedure (SAP).
    B. diverse allocation.
    C. reciprocal-cost allocation.
    D. common-cost allocation.
    E. dual-cost allocation.

    Answer: E LO: 2 Type: RC

30. Under dual-cost allocation, fixed costs are allocated on the basis of a user department's:
    A. long-run usage of a service department's output.
    B. short-run usage of a service department's output.
    C. long-run usage and short-run usage of a service department's output.
    D. neither long-run usage nor short-run usage of a service department's output.
    E. either long-run usage or short-run usage of a service department's output.

    Answer: A LO: 2 Type: RC

31. Consider the following statements about dual-cost allocation:

    I. Dual-cost allocation prevents a change in the short-run activity of one department from affecting the cost allocated to another department.
    II. Dual-cost allocations create an incentive for user department managers to understate their expected long-run service needs.
    III. Dual-cost allocations are generally preferred over lump-sum allocations, or those that combine variable and fixed costs together.

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

    Answer: E LO: 2 Type: RC

32. When allocating service department costs, companies should use:
    A. actual costs rather than budgeted costs, and separate rates for variable and fixed costs.
    B. budgeted costs rather than actual costs, and separate rates for variable and fixed costs.
    C. budgeted costs rather than actual costs, and a rate that combines variable and fixed costs.
    D. actual costs rather than budgeted costs, and a rate that combines variable and fixed costs.
    E. a rate that is based on matrix theory.

    Answer: B LO: 2 Type: RC

33. Gannon Corporation allocates administrative costs on the basis of staff hours. Short-run monthly usage and anticipated long-run monthly usage of staff hours for Operating Departments 1 and 2 follow.

	Dept. 1	Dept. 2	Total
Short-run usage (hours)	40,000	60,000	100,000
Long-run usage (hours)	45,000	55,000	100,000

If Gannon uses dual-cost accounting procedures and variable administrative costs total $200,000, the amount of variable administrative cost to allocate to Department 1 would be:
A. $80,000.
B. $85,000.
C. $90,000.
D. $100,000.
E. some other amount.

Answer: A LO: 2 Type: A

34. Ronan Corporation allocates administrative costs on the basis of staff hours. Short-run monthly usage and anticipated long-run monthly usage of staff hours for Operating Departments 1 and 2 follow.

	Dept. 1	Dept. 2	Total
Short-run usage (hours)	80,000	120,000	200,000
Long-run usage (hours)	90,000	110,000	200,000

If Ronan uses dual-cost accounting procedures and fixed administrative costs total $1,000,000, the amount of fixed administrative cost to allocate to Department 1 would be:
A. $400,000.
B. $450,000.
C. $500,000.
D. $850,000.
E. some other amount.

Answer: B LO: 2 Type: A

35. Nashville Corporation allocates administrative costs on the basis of staff hours. Short-run monthly usage and anticipated long-run monthly usage of staff hours for Operating Departments 1 and 2 follow.

	Dept. 1	Dept. 2	Total
Short-run usage (hours)	45,000	55,000	100,000
Long-run usage (hours)	48,000	52,000	100,000

Variable and fixed administrative costs total $180,000 and $400,000, respectively. If Nashville uses dual-cost accounting procedures, the total amount of administrative cost to allocate to Department 2 would be:
A. $301,600.
B. $307,000.
C. $313,600.
D. $319,000.
E. some other amount.

Answer: B LO: 2 Type: A

36. A company that uses activity-based costing would likely allocate costs from:
A. service departments to production departments.
B. service departments to products and services.
C. service departments to production departments and then to products and services.
D. activity-cost pools to production departments.
E. activity-cost pools to products and services.

Answer: E LO: 3 Type: RC

37. The point in a joint production process where each individual product becomes separately identifiable is commonly called the:
A. decision point.
B. separation point.
C. individual product point.
D. split-off point.
E. joint product point.

Answer: D LO: 4 Type: RC

38. The joint-cost allocation method that recognizes the revenues at split-off but does not consider any further processing costs is the:
A. relative-sales-value method.
B. net-realizable-value method.
C. physical-units method.
D. reciprocal-accounting method.
E. gross margin at split-off method.

Answer: A LO: 4 Type: RC

39. Which of the following methods should be selected if a company terminates all processing at the split-off point and desires to use a cost-allocation approach that considers the "revenue-producing ability" of each product?
    A. Gross margin at split-off method.
    B. Reciprocal-accounting method.
    C. Relative-sales-value method.
    D. Physical-units method.
    E. Net-realizable-value method.

    Answer: C LO: 4 Type: N

40. Which of the following choices correctly denotes the data needed to allocate joint costs under the relative-sales-value method?

	Sales Value of Product at Split-Off	Separable Cost	Sales Value of Product After Processing Beyond Split-Off
A.	Yes	Yes	No
B.	Yes	Yes	Yes
C.	Yes	No	No
D.	No	Yes	Yes
E.	No	No	Yes

    Answer: C LO: 4 Type: RC

41. When allocating joint costs, Wolstein calculates the final sales value of the various products manufactured and subtracts appropriate separable costs. The company is using the:
    A. gross margin at split-off method.
    B. reciprocal-accounting method.
    C. relative-sales-value method.
    D. physical-units method.
    E. net-realizable-value method.

    Answer: E LO: 4 Type: RC

42. Webster manufactures A, B, and C, all of which are joint products, and D, which is classified as a by-product. If joint manufacturing costs amount to $450,000 and the company is using a popular accounting method, the firm will:
    A. allocate $450,000 among A, B, and C.
    B. allocate $450,000 among A, B, C, and D.
    C. increase $450,000 by the net realizable value of D and then allocate the total among A, B, and C.
    D. decrease $450,000 by the net realizable value of D and then allocate the total among A, B, and C.
    E. decrease $450,000 by the net realizable value of D and then allocate the total among A, B, C, and D.

    Answer: D LO: 4 Type: RC

43. Ithaca Corporation uses the physical-units method to allocate costs among its three joint products: X, Y, and Z. The following data are available for the period just ended:

Joint processing cost: $800,000
Total production: 150,000 pounds
Share of joint cost allocated to X: $160,000
Share of joint cost allocated to Y: $400,000

Which of the following statements is true?
A. The company would have relied on the sales value of each product when allocating joint costs to X, Y, and Z.
B. Ithaca produced 30,000 pounds of Z during the period.
C. Ithaca produced 45,000 pounds of Z during the period.
D. Ithaca produced 105,000 pounds of Z during the period.
E. Based on the data presented, it is not possible to determine Ithaca's production of Z during the period.

Answer: C LO: 4 Type: RC, A

44. Garvin Corporation manufactures joint products P and Q. During a recent period, joint costs amounted to $80,000 in the production of 20,000 gallons of P and 60,000 gallons of Q. Garvin can sell P and Q at split-off for $2.20 per gallon and $2.60 per gallon, respectively. Alternatively, both products can be processed beyond the split-off point, as follows:

	P	Q
Separable processing costs	$15,000	$35,000
Sales price (per gallon) if processed beyond split-off	$3	$4

The joint cost allocated to Q under the relative-sales-value method would be:
A. $40,000.
B. $62,400.
C. $64,000.
D. $65,600.
E. some other amount.

Answer: B LO: 4 Type: A

45. Gunniston Corporation manufactures joint products W and X. During a recent period, joint costs amounted to $300,000 in the production of 20,000 gallons of W and 60,000 gallons of X. Both products will be processed beyond the split-off point, giving rise to the following data:

	W	X
Separable processing costs	$40,000	$160,000
Sales price (per gallon) if processed beyond split-off	$14	$12

The joint cost allocated to W under the net-realizable-value method would be:
A. $75,000.
B. $80,000.
C. $84,000.
D. $90,000.
E. some other amount.

Answer: D LO: 4 Type: A

Use the following to answer questions 46-48:

Rocky Mountain Company produces two products (X and Y) from a joint process. Each product may be sold at the split-off point or processed further. Additional processing requires no special facilities, and production costs of further processing are entirely variable and traceable to the products involved. Joint manufacturing costs for the year were $60,000. Sales values and costs were as follows:

			If Processed Further	
Product	Units Made	Sales Value at Split-off	Sales Value	Separable Costs
X	9,000	$40,000	$78,000	$10,500
Y	6,000	80,000	90,000	7,500

46. If the joint production costs are allocated based on the physical-units method, the amount of joint cost assigned to product X would be:
A. $20,000.
B. $24,000.
C. $30,000.
D. $36,000.
E. $40,000.

Answer: D LO: 4 Type: A

47. If the joint production costs are allocated based on the relative-sales-value method, the amount of joint cost assigned to product X would be:
A. $20,000.
B. $27,000.
C. $33,000.
D. $40,000.
E. some other amount.

Answer: A LO: 4 Type: A

48. If the joint production costs are allocated based on the net-realizable-value method, the amount of joint cost assigned to product Y would be:
    A. $20,000.
    B. $27,000.
    C. $33,000.
    D. $40,000.
    E. some other amount.

    Answer: C LO: 4 Type: A

49. Which of the following statements about joint-cost allocation is false?
    A. Joint-cost allocation is useful in deciding whether to further process a product after split-off.
    B. Joint-cost allocation is useful in making a profit determination about individual joint products.
    C. Joint-cost allocation is helpful in inventory valuation.
    D. Joint-cost allocation can be based on the number of units produced.
    E. Joint-cost allocation can be accomplished by using several different methods that focus on sales value and product "worth."

    Answer: A LO: 5 Type: N

50. Consider the following statements about joint product cost allocation:

    I. Joint product cost is allocated because it is necessary for inventory valuation.
    II. Joint product cost is allocated because it is necessary for making economic decisions about individual products (e.g., sell at split-off or process further).
    III. Joint cost may be allocated to products by using several different methods.

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

    Answer: D LO: 5 Type: RC

51. Eastside Hospital has two service departments (Patient Records and Accounting) and two "production" departments (Internal Medicine and Surgery). Which of the following allocations would likely take place under the reciprocal-services method of cost allocation?
    A. Allocation of Accounting cost to Patient Records.
    B. Allocation of Patient Records cost to Internal Medicine.
    C. Allocation of Surgery cost to Accounting.
    D. Allocation of Internal Medicine cost to Surgery.
    E. Allocations "A" and "B" above.

    Answer: E LO: 1 Type: N

52. Westside Hospital has two service departments (Patient Records and Accounting) and two "production" departments (Internal Medicine and Surgery). Which of the following allocations would not take place under the reciprocal-services method of cost allocation?
    A. Allocation of Accounting cost to Patient Records.
    B. Allocation of Patient Records cost to Internal Medicine.
    C. Allocation of Surgery cost to Accounting.
    D. Allocation of Internal Medicine cost to Surgery.
    E. Allocations "C" and "D" above.

    Answer: E LO: 1 Type: N

EXERCISES

Fundamentals of Direct and Step-Down Methods

53. Novaturn Corporation has three service departments (S1 and S2) and two production departments (P1 and P2). S1 and S2 both use the number of employees as an allocation base. The following data are available:

	Number of Employees	Budgeted Cost
S1	40	$172,000
S2	60	250,000
P1	300	660,000
P2	500	840,000

Required:

A. Assuming use of the direct method:
   1. Over how many employees would S1's budgeted cost be allocated?
   2. How much of S2's cost would be allocated to P1?
   3. How much of P1's cost would be allocated to S1?

B. Assuming use of the step-down method:
   1. How much of S1's cost would be allocated to S2? Novaturn allocates S1's costs prior to allocating those of S2.
   2. How much of S2's total cost would be allocated to P2?
   3. How much of S2's total cost would be allocated to S1?

LO: 1 Type: A

Answer:

A. 1. 800 (300 + 500)
   2. $93,750 [$250,000 x (300/800)]
   3. None, because production department costs are not allocated to service departments.

B. 1. S1's costs are allocated over 860 employees (60 + 300 + 500). Thus, $12,000 will be allocated to S2 [$172,000 x (60/860)].
   2. S2's costs total $262,000 ($250,000 + $12,000), resulting in $163,750 being allocated to P2 [$262,000 x (500/800).
   3. None, because S1's costs are allocated prior to those of S2. Once a department is closed, no costs are allocated back to it.

Direct and Step-Down Methods of Service Department Cost Allocation

54. Wyoming State College has two service departments, the Library and Computing Services, that assist the School of Business and the School of Health. Budgeted costs of the Library and Computing Services are $800,000 and $1,800,000, respectively. Usage of the service departments' output during the year is anticipated to be:

	Provider of Service	
User of Service	Library	Computing Services
Library	---	10%
Computing Services	---	---
School of Business	20%	60%
School of Health	80%	30%

Required:

A. Use the direct method to allocate the costs of the Library and Computing Services to the School of Business and the School of Health.
B. Repeat requirement "A" using the step-down method. Wyoming allocates the cost of Computing Services first.

LO: 1 Type: A

Answer:

A.

		School of Business		School of Health	
		Fraction	Amount	Fraction	Amount
Library	$ 800,000	2/10	$ 160,000	8/10	$ 640,000
Computing Services	1,800,000	6/9	1,200,000	3/9	600,000
Total	$2,600,000		$1,360,000		$1,240,000

B. Computing services ($1,800,000):

Library (10%)	$ 180,000
School of Business (60%)	1,080,000
School of Health (30%)	540,000

Library ($800,000 + $180,000 = $980,000):

School of Business (20%)	$ 196,000
School of Health (80%)	784,000

Direct and Step-Down Methods of Service Department Cost Allocation

55. Chicago, Inc., manufactures gauges for automobile dashboards. The company has two production departments, Molding and Assembly. There are three service departments: Human Resources, Maintenance, and Engineering. Usage of services by the various departments follows.

	Human Resources	Maintenance	Engineering
Human Resources	--	--	--
Maintenance	5%	--	--
Engineering	5%	10%	--
Molding	40%	40%	75%
Assembly	50%	50%	25%

The budgeted costs in Chicago's service departments are: Human Resources, $180,000; Maintenance, $270,000; and Engineering, $200,000. The company rounds all calculations to the nearest dollar.

Required:

A. Use the direct method to allocate Chicago's service department costs to the production departments.
B. Determine the proper departmental sequence to use in allocating the firm's service costs by the step-down method.
C. Ignoring your answer in part "B," assume that Human Resources costs are allocated first, Maintenance costs second, and Engineering costs third. Use the step-down method to allocate Chicago's service department costs.

LO: 1 Type: A, RC

Answer:

A.

		Molding		Assembly	
		Fraction	Amount	Fraction	Amount
Human Resources	$180,000	40/90	$ 80,000	50/90	$100,000
Maintenance	270,000	40/90	120,000	50/90	150,000
Engineering	200,000	75/100	150,000	25/100	50,000
Total	$650,000		$350,000		$300,000

B. First: Human Resources (serves two other service departments)
Second: Maintenance (serves one other service department)
Third: Engineering (serves no other service departments)

C. Human Resources ($180,000):

Maintenance (5%)	$ 9,000
Engineering (5%)	9,000
Molding (40%)	72,000
Assembly (50%)	90,000

Maintenance ($270,000 + $9,000 = $279,000):

Engineering (10%)	$ 27,900
Molding (40%)	111,600
Assembly (50%)	139,500

Engineering ($200,000 + $9,000 + $27,900 = $236,900):

Molding (75%)	$177,675
Assembly (25%)	59,225

Molding: $72,000 + $111,600 + $177,675 = $361,275
Assembly: $90,000 + $139,500 + $59,225 = $288,725

Direct and Step-Down Methods of Service Department Cost Allocation

56. Beckers Corporation is developing departmental overhead rates based on direct labor hours for its two production departments, Molding and Assembly. The Molding Department worked 20,000 hours during the period just ended, and the Assembly Department worked 40,000 hours. The overhead costs incurred by Molding and Assembly were $151,250 and $440,750, respectively.

Two service departments, Repair and Power, directly support the two production departments. These service departments have costs of $90,000 and $250,000, respectively. The following schedule reflects the use of Repair and Power's output by the various departments:

	Repair	Power	Molding	Assembly
Repair (repair hours)		500	500	4,000
Power (kilowatt hours)	120,000		420,000	60,000

Required:

A. Allocate the company's service department costs to production departments by using the direct method.
B. Calculate the overhead application rates of the production departments. Hint: Consider both directly traceable and allocated overhead when deriving your answer.
C. Allocate the company's service department costs to production departments by using the step-down method. Begin with the Power Department, and round calculations to the nearest dollar.

LO: 1 Type: A

Answer:

A.

		Molding		Assembly	
		Fraction	Amount	Fraction	Amount
Repair	$ 90,000	0.5/4.5	$ 10,000	4.0/4.5	$ 80,000
Power	250,000	4.2/4.8	218,750	0.6/4.8	31,250
	$340,000		$228,750		$111,250

B.

	Molding	Assembly
Allocated service department costs	$228,750	$111,250
Overhead costs, traceable to production departments	151,250	440,750
Total overhead costs	$380,000	$552,000
Direct labor hours	÷ 20,000	÷ 40,000
Overhead rate per hour	$19.00	$13.80

C. Power ($250,000):

Repair (120/600)	$ 50,000
Molding (420/600)	175,000
Assembly (60/600)	25,000

Repair ($90,000 + $50,000 = $140,000):

Molding (500/4,500)	$ 15,556
Assembly (4,000/4,500)	124,444

Molding: $175,000 + $15,556 = $190,556
Assembly: $25,000 + $124,444 = $149,444

Understanding Service Department Allocations

57. Consider the following independent cases that relate to service department cost allocations:

Case A: Strickland Company has two service departments [Human Resources (H/R) and Information Systems] and two production departments (Machining and Assembly). Human Resource cost is allocated by using the direct method based on the number of personnel in each department. For the period just ended, there were 189 employees in Machining, and Machining received $90,000 of H/R's overhead of $200,000. How many employees are in the Assembly Department?

Case B: Walter Burke, controller of Alexander Enterprises, wants service department managers to be aware that their use of other service departments costs the firm a substantial amount of money. Would Burke prefer the direct method or the step-down method of cost allocation? Why?

Case C: Lockwood Company has four service departments (S1, S2, S3, and S4) and two production departments (P1 and P2). The costs of S1 are allocated first, followed in order by the costs of S2, S3, and S4. Lockwood uses the step-down method, and the costs of S2 are allocated based on the number of computer hours used. Computer hours logged during the period were as follows: S1, 4,600; S2, 7,100; S3, 10,400; S4, 17,600; P1, 37,000; and P2, 48,600. Over how many hours would S2's cost be allocated?

Case D: A recently hired staff accountant noted that given the nature of the allocations, the total cost allocated to production departments is typically less under the step-down method than under the direct method. Do you agree with the accountant? Why?

Required:
Answer the questions that are raised in Cases A, B, C, and D.

LO: 1 Type: A, N

Answer:
Case A: Machining has been allocated 45% of H/R's cost ($90,000 ÷ $200,000) because it has 45% of the employees in the production departments. Since 189 represents 45% of the total, there are 420 employees in production (189 ÷ 0.45). Thus, Assembly has 231 personnel (420 - 189).

Case B: Burke would prefer the step-down method because service department costs are allocated to other service departments (although not all). Such a practice makes managers aware that services are not cost-free to the organization.

Case C: 113,600 (10,400 + 17,600 + 37,000 + 48,600)

Case D: No. Under both approaches, all service department costs are allocated to production departments. This process yields equal totals for each method.

Dual-Cost Allocations

58. Renaissance, Inc., has centralized much of its specialized data processing operation, with the Computer Department performing services for Departments A and B. Service hours consumed during quarter no. 1 and quarter no. 2 follow.

	A	B
Quarter no. 1	60	60
Quarter no. 2	40	60

Computer Department operating costs were:

	Variable (Per Hour)	Fixed
Quarter no. 1	$50	$40,000
Quarter no. 2	45	38,000

Company policy currently requires that total variable and fixed costs be combined and allocated as a lump-sum to users based on service hours.

Renaissance has been financially healthy for a number of years but began to experience problems toward the end of quarter no. 1. In response to these problems, management issued a directive to closely monitor costs and computer usage, effective with the start of quarter no. 2.

Required:

A. Compute quarter no. 1's total computer cost and determine the allocation to Department A and Department B.
B. How much cost would be allocated to Departments A and B during quarter no. 2, and how would the heads of these departments likely react to the allocations in light of management's directive?
C. Assume that at the beginning of quarter no. 2, the company switched to dual-cost allocations, with variable costs allocated based on current usage and fixed costs allocated based on long-run average utilization. An analysis of projected usage found that work for Department A was expected to consume 55% of the Computer Department's time over the forthcoming year. How much cost would be allocated to A and B in quarter no. 2?
D. Given the use of dual allocations, how, if at all, would a short-term increase or decrease in A's current usage affect the quarterly cost allocation that is charged to Department B?

LO: 2 Type: A, N

Answer:

A. Variable cost: (60 + 60) x $50 $ 6,000
Fixed cost 40,000
Total cost $46,000

Since each department consumed 60 hours of services, the cost would be split equally: $46,000 ÷ 2 = $23,000.

B. Variable cost: (40 + 60) x $45 $ 4,500
Fixed cost 38,000
Total cost $42,500

Department A: (40 ÷ 100) x $42,500 = $17,000
Department B: (60 ÷ 100) x $42,500 = $25,500

The head of A would be pleased because the department's decreased usage resulted in a $6,000 reduction in cost ($23,000 - $17,000). In contrast, the head of B would likely be unhappy. Although unable to reduce usage, usage did remain constant—a situation that produced a $2,500 increase in cost ($25,500 - $23,000) despite the fact that overall cost declined.

C.

	A	B
Variable:		
40 hours x $45	$ 1,800	
60 hours x $45		$ 2,700
Fixed:		
$38,000 x 55%	20,900	
$38,000 x 45%		17,100
Total	$22,700	$19,800

D. There is no effect on B. The variable costs charged to Department A would increase or decrease, with other allocations remaining the same.

Joint-Cost Allocations

59. Suppose that one hog yields 300 pounds of ham, 200 pounds of chops, and 100 pounds of miscellaneous items. The sales value of ham is $1.20 per pound; chops, $1.50 per pound; and miscellaneous items, $0.90 per pound. The hog costs $580, and processing costs are $20.

Required:
A. Determine the proper allocation of joint costs to the three products by using the physical-units method.
B. Repeat part "B" by using the relative-sales-value method.

LO: 4 Type: A

Answer:

A.

	Weight at the Split-Off Point	Relative Proportion	Allocation of Joint Cost*
Ham	300 pounds	3/6	$300
Chops	200 pounds	2/6	200
Miscellaneous items	100 pounds	1/6	100
	600 pounds		$600

*$580 + $20

B.

	Sales Value at Split-Off	Relative Proportion	Allocation of Joint Cost
Ham (300 x $1.20)	$360	36/75	$288
Chops (200 x $1.50)	300	30/75	240
Miscellaneous items (100 x $0.90)	90	9/75	72
	$750		$600

Fundamentals of Joint-Cost Allocations

60. Higgins Corporation manufactures two chemicals (Flextra and Hydro) in a joint process. Data from a recent month follow.

    Direct materials used: $360,000
    Direct labor: $150,000
    Manufacturing overhead: $690,000
    Manufacturing output:
        Flextra: 40,000 gallons
        Hydro: 120,000 gallons

    Flextra sells for $15 per gallon and Hydro sells for $20 per gallon.

    Required:
    A. Compute the total joint costs to be allocated to Flextra and Hydro.
    B. Compute the joint costs that would be allocated to Flextra by using the physical-units method.
    C. Compute the joint costs that would be allocated to Hydro by using the relative-sales-value method.
    D. Assume that Hydro can be converted into a more refined product, Hydro-R, in a totally separable process at an additional cost of $4 per gallon. Hydro-R can be sold in the marketplace for $26 per gallon.
        1. Compute the net realizable value of Hydro-R.
        2. If Higgins allocated $800,000 of joint cost to Hydro-R and sold 90% of the production completed, determine the cost of remaining Hydro-R that would be transferred to the company's month-end balance sheet as finished-goods inventory.

    LO: 4 Type: A

    Answer:
    A. $1,200,000 ($360,000 + $150,000 + $690,000)

    B. Flextra constitutes 25% of the productive output [40,000 ÷ (40,000 + 120,000)] and would therefore absorb $300,000 of joint cost ($1,200,000 x 25%).

    C. The total sales value of the two products is $3,000,000: Flextra (40,000 gallons x $15 = $600,000) + Hydro (120,000 gallons x $20 = $2,400,000). Since Hydro has 80% of the sales value ($2,400,000 ÷ $3,000,000), the company will allocate $960,000 of joint cost ($1,200,000 x 80%).

    D. 1. Sales value (120,000 gallons x $26 = $3,120,000) - costs beyond split-off (120,000 gallons x $4 = $480,000) = $2,640,000.

        2. The total cost of production is $1,280,000 ($800,000 + $480,000). Since 90% of the production is sold, 10% of the cost, or $128,000, remains as inventory.

Joint-Cost Allocations

61. Ohio Chemical manufactures two industrial chemicals in a joint process. In October, direct material costing $120,000 was processed at a cost of $300,000, resulting in 16,000 pounds of Pentex and 4,000 pounds of Glaxco. Pentex sells for $35 per pound and Glaxco sells for $60 per pound. Management generally processes each of these chemicals further in separable processes to produce more refined products. Pentex is processed separately at a cost of $7.50 per pound, with the resulting product, Pentex-R, selling for $45 per pound. Glaxco is processed separately at a cost of $10 per pound, and the resulting product, Glaxco-R, sells for $100 per pound.

Required:
A. Compute the company's total joint production costs.
B. Assuming that total joint production costs amounted to $500,000, allocate these costs by using:
   1. The physical-units method.
   2. The relative-sales-value method.
   3. The net-realizable-value method.

LO: 4 Type: A

Answer:
A. Joint production costs total $420,000 ($120,000 + $300,000).

B. 1.

	Weight at the Split-Off Point	Relative Proportion	Allocation of Joint Cost
Pentex	16,000	16/20	$400,000
Glaxco	4,000	4/20	100,000
	20,000		$500,000

2.

	Sales Value at Split-Off	Relative Proportion	Allocation of Joint Cost
Pentex (16,000 x $35)	$560,000	56/80	$350,000
Glaxco (4,000 x $60)	240,000	24/80	150,000
	$800,000		$500,000

3.

	Sales Value of Final Product*	Costs Past Split-off**	Net Realizable Value	Relative Proportion	Allocation of Joint Cost
Pentex-R	$ 720,000	$120,000	$600,000	60/96	$312,500
Glaxco-R	400,000	40,000	360,000	36/96	187,500
	$1,120,000	$160,000	$960,000		$500,000

* Pentex-R: 16,000 x $45; Glaxco-R: 4,000 x $100
**Pentex-R: 16,000 x $7.50; Glaxco-R: 4,000 x $10

Net-Realizable-Value Method, Gross Margin Calculation

62. Douglas Company, a new firm, manufactures two products, J and K, in a common process. The joint costs amount to $80,000 per batch of finished goods. Each batch results in 20,000 liters of output, of which 80% are J and 20% are K.

The two products are processed beyond the split-off point, with Douglas incurring the following separable costs: J, $2 per liter; K, $5 per liter. After the additional processing, the selling price of J is $12 per liter, and the selling price of K is $15 per liter.

Required:

A. Determine the proper allocation of joint costs if the company uses the net-realizable-value method.
B. Assume that Douglas sold all of its production of K during the current accounting period. Compute K's sales revenue, cost of goods sold, and gross margin.
C. Is the firm's cost-of-goods-sold figure influenced by the choice of a joint-cost allocation method? Briefly explain.

LO: 4, 5 Type: A, N

Answer:

A.

	Sales Value of Final Product	Costs Past Split-Off	Net Realizable Value	Relative Proportion	Allocation of Joint Cost
J (16,000 x $12)	$192,000	$32,000	$160,000	160/200	$64,000
K (4,000 x $15)	60,000	20,000	40,000	40/200	16,000
			$200,000		$80,000

B.

Joint costs	$16,000
Costs beyond split-off	20,000
Cost of goods sold	$36,000
Sales revenue	$60,000
Cost of goods sold	36,000
Gross margin	$24,000

C. Yes. Cost of goods sold is based on both separable costs and joint cost. The choice of an allocation method will influence the amount of joint cost charged to the product.

Analysis of Joint Costs: Working Backward

63. Barry Company manufactures X-111, X-112, and X-113 from a joint process. The following information is available for the period just ended:

	X-111	X-112	X-113	Total
Units produced	6,000	14,000	30,000	50,000
Joint cost allocation	?	$18,400	?	$ 80,000
Sales value at split-off	$104,000	?	?	$260,000

Required:

A. Does Barry allocate joint costs by using the physical-units method? Explain.

B. Assume that Barry does not use the physical-units method but instead allocates joint costs by using the relative-sales-value method. Find the four unknowns in the preceding table.

LO: 4 Type: A, N

Answer:

A. No. X-112 comprises 28% of the total units produced (14,000 ÷ 50,000); however, the product was allocated 23% of the total joint cost ($18,400 ÷ $80,000). Apparently, then, another method is being used.

B. X-111 has 40% of the sales value ($104,000 ÷ $260,000), resulting in 40% of the joint cost ($80,000 x 40%), or $32,000. This leaves $29,600 to be allocated to X-113 ($80,000 - $32,000 - $18,400). The sales values follow by using the same percentages that are used in the cost allocation ($18,400 ÷ $80,000 = 23%; $260,000 x 23% = $59,800) and ($29,600 ÷ $80,000 = 37%; $260,000 x 37% = $96,200).

	X-111	X-112	X-113	Total
Units produced	6,000	14,000	30,000	50,000
Joint cost allocation	$ 32,000	$18,400	$29,600	$ 80,000
Sales value at split-off	$104,000	$59,800	$96,200	$260,000

Joint Costs; Analysis of Joint Production Process

64. Mercury Corporation allocates joint costs by using the net-realizable-value method. In the company's Michigan plant, products D and E emerge from a joint process that costs $250,000. E is then processed at a cost of $220,000 into products F and G. Data pertaining to D, F, and G follow.

	D	F	G
Costs beyond split-off	$50,000	$27,000	$25,000
Selling price	40	38	50
Pounds produced	10,000	4,000	2,000

Required:

A. Allocate the $220,000 processing cost between products F and G.
B. From a profitability perspective, should product E be processed into products F and G? Show your calculations.
C. Assume that the net realizable value associated with E is zero. How would you allocate the joint cost of $250,000?

LO: 4 Type: A, N

Answer:

A.

	Sales Value of Final Product	Costs Past Split-Off	Net Realizable Value	Relative Proportion	Allocation of Joint Cost
F (4,000 x $38)	$152,000	$27,000	$125,000	125/200	$137,500
G (2,000 x $50)	100,000	25,000	75,000	75/200	82,500
			$200,000		$220,000

B. No, the company is losing $20,000: Net realizable value ($200,000) - joint costs ($220,000).

C. The $250,000 cost is a joint cost between D and E. Since product D has a positive net realizable value of $350,000 [(10,000 pounds x $40) - $50,000] and E's is zero, all $250,000 would be charged to D.

DISCUSSION QUESTIONS

Overview of Service-Department Cost Allocation Methods

65. Companies are free to use the direct, step-down, and reciprocal allocation methods when dealing with service-department costs.

    Required:
    A. How does the direct method work? What is its chief limitation?
    B. Is the step-down method an improvement over the direct method? Explain.
    C. Which of the three methods is the most correct from a conceptual viewpoint? Why?

    LO: 1, 6 Type: RC, N

    Answer:
    A. The direct method allocates joint costs solely to producing departments. This method does not allocate costs to other service departments and is based on the erroneous assumption that service departments do not service each other.

    B. The step-down method is an improvement over the direct method, as it recognizes that service departments service both producing departments and other service departments. Costs are allocated accordingly. The step-down method is slightly more complex than the direct method, requiring a determination of the proper order of departmental allocations.

    C. The reciprocal method is the most correct approach from a conceptual viewpoint. This method fully recognizes all services provided by service departments. The direct method completely ignores the fact that service departments service each other. The step-down method recognizes only some of these services, as once a department is closed out, no cost is reallocated back to it.

Dual Rate Versus Single Rate

66. Many companies use the dual-rate method of cost allocation.

    Required:
    A. How does the dual-rate method work?
    B. Is there any advantage of the dual-rate method over a method that uses a combined, lump-sum single rate? Briefly explain.

    LO: 2 Type: RC

    Answer:
    A. The dual-rate method involves creating two overhead rates, one for variable costs and another for fixed costs. The variable costs are normally allocated on the basis of short-run usage of the service department's output; fixed costs are allocated on the basis of long-run usage.

    B. Yes. When a single rate is used, the cost allocated to a user department may be influenced by the amount of service consumed by another department. For example, a user department's service consumption could remain flat; yet the amount of cost allocated to that department could increase or decrease over previous amounts based solely on actions of other users. Dual rates eliminate this problem.