

Managerial and Cost Accounting Exercises IV

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Larry M. Walther & Christopher J. Skousen

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1st edition

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ISBN 978-87-7681-877-7

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Problem 1

Amsterdam Corporation produces medical grade isotopes. The isotopes are produced in a single continuous process and Amsterdam uses the weighted-average process costing method of accounting for production.

The production process requires constant utilization of facilities and equipment, as well as direct labor by skilled technicians. As a result, direct labor and factory overhead are both deemed to be introduced uniformly throughout production.

Amsterdam Corporation prepared the following “unit reconciliation” for the month of April:

UNIT RECONCILIATION		EQUIVALENT UNITS CALCULATIONS:		
	QUANTITY SCHEDULE		CONVERSION	
		DIRECT MATERIALS	DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process	7,500			
Started into Production	<u>9,000</u>			
<i>Total Units into Production</i>	<u>16,500</u>			
<hr/>				
To Finished Goods	12,000	12,000	12,000	12,000
Ending Work in Process	4,500	<u>3,150</u>	<u>2,250</u>	<u>2,250</u>
<i>Total Units Reconciled</i>	<u>16,500</u>	15,150	14,250	14,250

Ending WIP Completion Status:	
●	Materials = 70%
●	Conversion = 50%

The above beginning work in process inventory had an assigned cost of \$4,500,000, divided between direct materials (50%), direct labor (30%), and factory overhead (20%).

Additional costs incurred during April were \$15,000,000, divided between direct materials (15%), direct labor (20%), and factory overhead (65%).

Prepare a schedule showing the calculation of cost per equivalent unit.

Worksheet 1

COST PER EQUIVALENT UNIT:

	TOTAL COST	DIRECT MATERIALS	CONVERSION	
			DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process				
Cost incurred during period				
Total cost				
Equivalent units				
Costs per equivalent unit				

Solution 1

COST PER EQUIVALENT UNIT:

	TOTAL COST	DIRECT MATERIALS	CONVERSION	
			DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process	\$ 4,500,000	\$ 2,250,000	\$ 1,350,000	\$ 900,000
Cost incurred during period	<u>15,000,000</u>	<u>2,250,000</u>	<u>3,000,000</u>	<u>9,750,000</u>
Total cost	<u>\$ 19,500,000</u>	<u>\$ 4,500,000</u>	<u>\$ 4,350,000</u>	<u>\$ 10,650,000</u>
Equivalent units		÷ 15,150	÷ 14,250	÷ 14,250
Costs per equivalent unit		\$ 297.03	\$ 305.26	\$ 747.37

Problem 2

Amsterdam Corporation produces medical grade isotopes. The isotopes are produced in a single continuous process and Amsterdam uses the FIFO process costing method of accounting for production.

The production process requires constant utilization of facilities and equipment, as well as direct labor by skilled technicians. As a result, direct labor and factory overhead are both deemed to be introduced uniformly throughout production.

Amsterdam Corporation prepared the following “unit reconciliation” for the month of April:

UNIT RECONCILIATION		EQUIVALENT UNITS CALCULATIONS:		
	QUANTITY SCHEDULE	CONVERSION		
		DIRECT MATERIALS	DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process	7,500			
Started into Production	9,000			
<i>Total Units into Production</i>	<u>16,500</u>			
To Finished Goods				
From beginning WIP	7,500	2,250	2,625	2,625
Started and completed	4,500	4,500	4,500	4,500
Ending Work in Process	4,500	3,150	2,250	2,250
<i>Total Units Reconciled</i>	<u>16,500</u>	9,900	9,375	9,375

The above beginning work in process inventory had an assigned cost of \$4,500,000, divided between direct materials (30%), direct labor (35%), and factory overhead (35%).

Additional costs incurred during April were \$15,000,000, divided between direct materials (15%), direct labor (20%), and factory overhead (65%).

Prepare a schedule showing the calculation of cost per equivalent unit.

Worksheet 2

COST PER EQUIVALENT UNIT:

	TOTAL COST	DIRECT MATERIALS	CONVERSION	
			DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process				
Cost incurred during period				
Total cost				
Equivalent units				
Costs per equivalent unit				

Solution 2

COST PER EQUIVALENT UNIT:

	TOTAL COST	DIRECT MATERIALS	CONVERSION	
			DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process	\$ 4,500,000			
Cost incurred during period	<u>15,000,000</u>	\$ 2,250,000	\$ 3,000,000	\$ 9,750,000
Total cost	<u>\$ 19,500,000</u>			
Equivalent units		÷ 9,900	÷ 9,375	÷ 9,375
Costs per equivalent unit		\$ 227.27	\$ 320.00	\$ 1.040.00

Problem 3

Amsterdam Corporation produces medical grade isotopes. The isotopes are produced in a single continuous process and Amsterdam uses the FIFO process costing method of accounting for production.

The production process requires constant utilization of facilities and equipment, as well as direct labor by skilled technicians. As a result, direct labor and factory overhead are both deemed to be introduced uniformly throughout production.

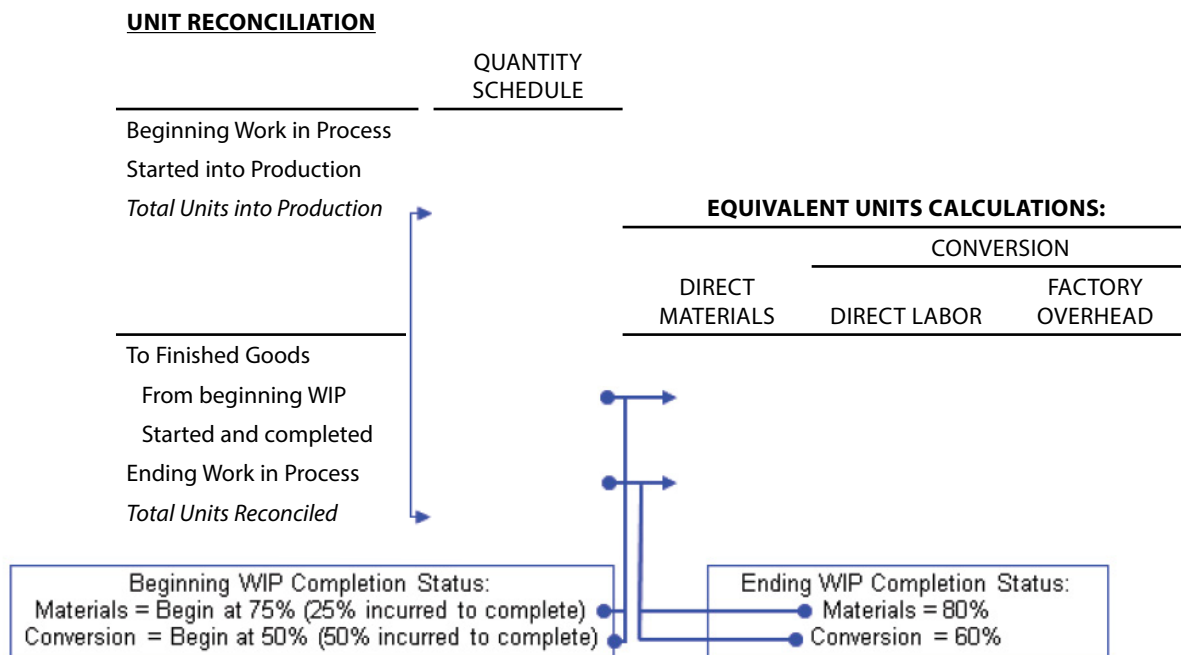
At the beginning of April, 20X7, 7,500 isotopes were in process. During April, an additional 9,000 isotopes were started. 12,000 isotopes were completed and transferred to finished goods.

As of the beginning of the month, work in process was 75% complete with respect to materials and 50% complete with respect to conversion costs.

As of the end of the month, work in process was 80% complete with respect to materials and 60% complete with respect to conversion costs.

Prepare a “unit reconciliation” schedule that includes calculations showing the equivalent units of materials, direct labor, and factory overhead for April.

Worksheet 3



Solution 3

UNIT RECONCILIATION

	QUANTITY SCHEDULE
Beginning Work in Process	7,500
Started into Production	9,000
<i>Total Units into Production</i>	16,500
<hr/>	
To Finished Goods	
From beginning WIP	7,500
Started and completed	4,500
Ending Work in Process	4,500
<i>Total Units Reconciled</i>	16,500

EQUIVALENT UNITS CALCULATIONS:

DIRECT MATERIALS	CONVERSION	
	DIRECT LABOR	FACTORY OVERHEAD
1,875	3,750	3,750
4,500	4,500	4,500
3,600	2,700	2,700
9,975	10,950	10,950

Beginning WIP Completion Status:
 Materials = Begin at 75% (25% incurred to complete)
 Conversion = Begin at 50% (50% incurred to complete)

Ending WIP Completion Status:
 Materials = 80%
 Conversion = 60%

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Problem 4

Amsterdam Corporation produces medical grade isotopes. The isotopes are produced in a single continuous process and Amsterdam uses the weighted-average process costing method of accounting for production.

Below is the company's calculation of cost per equivalent unit for September. During September, the company completed and transferred 12,000 isotopes to finished goods. An additional 6,000 units were still in process at the end of the month. The ending work in process was 70% complete with respect to direct materials and 30% complete with respect to both elements of conversion cost.

Prepare a schedule showing the allocation of total cost between finished goods and ending work in process.

COST PER EQUIVALENT UNIT:

	TOTAL COST	DIRECT MATERIALS	CONVERSION	
			DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process	\$ 5,850,000	\$ 1,462,500	\$ 1,170,000	\$ 3,217,500
Cost incurred during period	13,950,000	2,790,000	4,185,000	6,975,000
Total cost	<u>\$ 19,800,000</u>	<u>\$ 4,252,500</u>	<u>\$ 5,355,000</u>	<u>\$ 10,192,500</u>
Equivalent units		÷ 16,200	÷ 13,800	÷ 13,800
Costs per equivalent unit		\$ 262.50	\$ 388.04	\$ 738.59

\$1,126.63

\$1,389.13

Worksheet 4

COST ALLOCATION:

	TOTAL COST	EQUIVALENT UNITS		
		DIRECT MATERIALS	CONVERSION	
		DIRECT LABOR	FACTORY OVERHEAD	
Transferred to Finished Goods				
Ending Work in Process				
Total Ending Work in Process				
Total Cost Allocation				

Solution 4

	TOTAL COST	EQUIVALENT UNITS		
		DIRECT MATERIALS	CONVERSION	
		DIRECT LABOR	FACTORY OVERHEAD	
Transferred to Finished Goods (12,000 units @ \$1,389.13 each)	\$ 16,669,560	12,000	12,000	12,000
Ending Work in Process				
Incurring (Material @ \$262.50)	\$ 1,102,500	4,200		
Incurring (Conversion @ \$1,126.63)	2,027,934		1,800	1,800
Total Ending Work in Process	\$ 3,130,434			
Total Cost Allocation	\$ 19,799,994			

Problem 5

Amsterdam Corporation produces medical grade isotopes. The isotopes are produced in a single continuous process and Amsterdam uses the FIFO process costing method of accounting for production.

Below is the company’s calculation of cost per equivalent unit for September. During September, the company completed and transferred 12,000 isotopes to finished goods. An additional 6,000 units were still in process at the end of the month. The beginning work in process consisted of 6,000 units that were 50% complete with respect to direct materials and 40% complete with respect to both elements of conversion cost. The ending work in process was 70% complete with respect to direct materials and 30% complete with respect to both elements of conversion cost.

Prepare a schedule showing the allocation of total cost between finished goods and ending work in process.

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	TOTAL COST	CONVERSION		
		DIRECT MATERIALS	DIRECT LABOR	FACTORY OVERHEAD
Beginning Work in Process	\$ 5,850,000			
Cost incurred during period	<u>13,950,000</u>	\$ 2,790,000	\$ 3,487,500	\$ 7,672,500
Total cost	<u>\$ 19,800,000</u>			
Equivalent units		÷ 13,200	÷ 10,200	÷ 10,200
Costs per equivalent unit		\$ 211.36	\$ 341.91	\$ 752.21

\$1,094.12

\$1,305.48

Worksheet 5

COST ALLOCATION:

	TOTAL COST	EQUIVALENT UNITS	
		DIRECT MATERIALS	CONVERSION
		DIRECT LABOR	FACTORY OVERHEAD
Transferred to Finished Goods			
From Beginning Inventory			
Cost in Beginning Inventory			
To complete (Material @ \$217.40)	<input type="text"/>		
To complete (Conver. @ \$1,003.42)		<input type="text"/>	
Started and Comp. (@ \$1,220.82)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total Cost to Finished Goods			
Ending Work in Process			
Incurring (Material @ \$217.40)	<input type="text"/>		
Incurring (Conversion @ \$1,003.42)		<input type="text"/>	
Total Ending Work in Process			
<hr/>			
Total Cost Allocation			

Solution 5

COST ALLOCATION:

	TOTAL COST	EQUIVALENT UNITS		
		DIRECT MATERIALS	CONVERSION	
		DIRECT LABOR	FACTORY OVERHEAD	
Transferred to Finished Goods				
From Beginning Inventory				
Cost in Beginning Inventory	\$ 5,850,000			
To complete (Material @ \$211.36)	634,091	3,000		
To complete (Conver. @ \$1,094.12)	<u>2,625,882</u>		2,400	2,400
	\$ 9,109,973			
Started and Comp. (@ \$1,305.48)	<u>7,832,888</u>	6,000	6,000	6,000
Total Cost to Finished Goods	\$ <u>16,942,861</u>			
Ending Work in Process				
Incurring (Material @ \$211.36)	\$ 887,727	4,200		
Incurring (Conversion @ \$1,094.12)	<u>1,969,412</u>		1,800	1,800
Total Ending Work in Process	\$ <u>2,857,139</u>			
Total Cost Allocation	\$ <u><u>19,800,000</u></u>			

Problem 6

Cambridge Office Furniture produces high-quality desks. Each desk is produced from a single large tree in a 3-step process consisting of milling, sanding, and cutting. All raw material is introduced at the start of the milling process. The company uses a process costing system for all costs incurred throughout the production cycle. The following data were extracted from each department's cost of production report prepared for November:

Milling Dept. The beginning balance of work in process was \$550,000. During November, additional costs of \$990,000 were incurred. The additional costs were attributable to direct materials (80%), direct labor (15%), and factory overhead (5%). The ending balance of work in process was \$265,000.

Sanding Dept. The beginning balance of work in process was \$305,000. During November, additional costs of \$600,000 were incurred. The additional costs were attributable to direct labor (75%) and factory overhead (25%). The ending balance of work in process was \$420,000.

Cutting Dept. The beginning balance of work in process was \$490,000. During November, additional costs of \$175,000 were incurred. The additional costs were attributable to direct labor (65%) and factory overhead (35%). The ending balance of work in process was \$260,000.

Prepare summary journal entries to reflect costs incurred by each department during November, as well as the transfer of costs between departments and into finished goods.

Worksheet 6

GENERAL JOURNAL			
Date	Accounts	Debit	Credit
April			
	<i>To record material, labor, and overhead for Milling</i>		
April			
	<i>To transfer completed units from Milling to Sanding (\$550,000 + \$990,000 - \$265,000)</i>		
April			
	<i>To record labor and overhead for Sanding</i>		
April			
	<i>To transfer completed units from Sanding to Cutting</i>		
April			
	<i>To record labor and overhead for Cutting</i>		
April			
	<i>To transfer completed units to finished goods</i>		

Solution 6

GENERAL JOURNAL			
Date	Accounts	Debit	Credit
April	Work in Process Inventory – Mill	990,000	
	Raw Materials Inventory		792,000
	Salaries Payable		148,500
	Factory Overhead		49,500
	<i>To record material, labor, and overhead for Milling</i>		
April	Work in Process Inventory – Sand	1,275,000	
	Work in Process Inventory – Mill		1,275,000
	<i>To transfer completed units from Milling to Sanding (\$550,000 + \$990,000 – \$265,000)</i>		
April	Work in Process Inventory – Sand	600,000	
	Salaries Payable		450,000
	Factory Overhead		150,000
	<i>To record labor and overhead for Sanding</i>		
April	Work in Process Inventory – Cut	1,760,000	
	Work in Process Inventory – Sand		1,760,000
	<i>To transfer completed units from Sanding to Cutting (\$305,000 + \$1,275,000 + 600,000 – \$420,000)</i>		
April	Work in Process Inventory – Cut	175,000	
	Salaries Payable		113,750
	Factory Overhead		61,250
	<i>To record labor and overhead for Cutting</i>		
April	Finished Goods Inventory	2,165,000	
	Work in Process Inventory – Cut		2,165,000
	<i>To transfer completed units to finished goods (\$490,000 + \$1,760,000 + 175,000 – \$260,000)</i>		

Problem 7

Carpet Clean produces carpet cleaning products. Ultimate Clean is a one-step cleaner that is produced in a three-step process. The three phases of production consist of mixing, blending, and bottling. Below is a partial schedule of December's costs for each phase of production. Complete the schedule and respond to the questions that follow.

	<u>Beginning Balance</u>	<u>December Costs</u>	<u>Cost Transfers</u>	<u>Ending Balance</u>
Mixing	\$ 518,580	\$ 2,599,963	\$ (1,834,357)	?
Blending	570,060	?	? (6,082,036)	?
Bottling	<u>818,820</u>	<u>1,717,200</u>	? ?	?
	<u>?</u>	<u>\$ 8,477,984</u>	<u>\$ (7,480,217)</u>	<u>?</u>

- Which department experienced a decrease in work-in-process during December?
- How much was transferred to finished goods inventory?
- What will be reported as “work in process” at the end of December?
- If total finished goods inventory decreased by \$180,000, and the selling price is equal to 200% of cost of goods sold, how much would be reported for Carpet Clean sales during December?

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Worksheet 7

	Beginning Balance	December Costs	Cost Transfers	Ending Balance
Mixing	\$ 518,580	\$ 2,599,963	\$ (1,834,357)	?
Blending	570,060	?	? (6,082,036)	?
Bottling	<u>818,820</u>	<u>1,717,200</u>	? ?	<u>?</u>
	<u>?</u>	<u>\$ 8,477,984</u>	<u>\$ (7,480,217)</u>	<u>?</u>

- a)
- b)
- c)
- d)

Solution 7

	Beginning Balance	December Costs	Cost Transfers	Ending Balance
Mixing	\$ 518,580	\$ 2,599,963	\$ (1,834,357)	\$ 1,284,186
Blending	570,060	4,160,821	1,834,357 (6,082,036)	483,202
Bottling	<u>818,820</u>	<u>1,717,200</u>	6,082,036 (7,480,217)	<u>1,137,839</u>
	<u>\$ 1,907,460</u>	<u>\$ 8,477,984</u>	<u>\$ (7,480,217)</u>	<u>\$ 2,905,227</u>

- a) Blending experienced a decrease in work in process.
- b) \$7,480,217 was transferred from bottling to finished goods inventory.
- c) Work in process inventory will be reported at \$2,905,227.
- d) If total finished goods inventory decreased by \$180,000, the cost of goods sold would equal \$7,660,217 (\$7,480,217 + \$180,000). The selling price would be \$15,320,434 (200% × \$7,660,217).

Problem 8

Backyard Playground produces childrens swing-sets. 4,500 swing-sets were produced in a recent production run. The run required 1,500 machine hours, and also required four “set-ups” of equipment. Final inspection required 75 hours of inspection activity. Estimated overhead is estimated at \$25 per machine hour, plus \$3,500 per “set-up” and \$20 per inspection hour. Direct materials and direct labor total \$500 per swing-set.

- a) Apply activity-based costing and determine the amount assigned to a swing-set.
- b) For GAAP purposes, Backyard Playground applies traditional costing methods, and allocates overhead at \$40 per machine hour. How much cost would be assigned to the 4,500 swing-sets? What is the per unit cost of a swing-set under the traditional approach? What might explain the higher cost assignment, and how could this influence business decision making?

Worksheet 8

a)

b)

Solution 8

a)

	Units	Per Unit Cost	Total Cost
Direct material/labor	4,500 swing-sets	\$500	\$ 2,250,000
Machine hours	1,500 hours	\$25	37,500
"Set ups"	4	\$3,500	14,000
Inspection	75 hours	\$20	1,500
			\$ 2,303,000

$\$2,303,000 \div 4,500 \text{ seahorses} = \$511.78 \text{ per swing-set}$

b) A traditional approach would assign \$2,310,000 to the swing-sets ($(\$500 \times 4,500 \text{ swing-sets}) + (\$40 \times 1,500 \text{ machine hours})$). This yields a per unit cost of \$513.33 per swing-set.

The traditional method results in a slightly higher assigned cost, possibly because of the averaging of all overhead costs into a single cost pool that is allocated based only on machine hours. ABC divides the process into specific activities, with a goal of determining how much of each specific activity is consumed. In this problem, ABC produced a lower overall cost, possibly because the swing-sets did not involve as many set-ups and/or inspections as did other production activities.

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