Capítulo 8 Activity-Based Costing

Exercise 4-2 (15 minutes)

1. The activity rates are computed as follows:

Activity Cost Pool	*(a)* *Estimated Overhead Cost*	*(b)* *Expected Activity*	*(a) ÷ (b)* *Activity Rate*
Labor related	$ 52,000	8,000 DLHs	$ 6.50 per DLH
Machine related	15,000	20,000 MHs	0.75 per MH
Machine setups................................	42,000	1,000 setups	42.00 per setup
Production orders	18,000	500 orders	36.00 per order
Product testing................................	48,000	2,000 tests	24.00 per test
Packaging	75,000	5,000 packages	15.00 per package
General factory...............................	108,800	8,000 DLHs	13.60 per DLH
Total	$358,800		

2. The predetermined overhead rate based entirely on direct labor-hours would be computed as follows:

Total estimated overhead cost (a)	$358,800
Total expected direct labor-hours (b)	8,000 DLHs
Predetermined overhead rate (a) ÷ (b)..........................	$ 44.85 per DLH

Exercise 4-3 (30 minutes)

The unit product costs for the products are a combination of direct materials, direct labor, and overhead costs. The overhead costs assigned to each product would be computed as follows:

	J78 Expected Activity	J78 Amount	B52 Expected Activity	B52 Amount
Labor related, at $7.00 per direct labor-hour	1,000	$ 7,000	40	$ 280
Machine related, at $3.00 per machine-hour	3,200	9,600	30	90
Machine setups, at $40.00 per setup	5	200	1	40
Production orders, at $160.00 per order	5	800	1	160
Shipments, at $120.00 per shipment	10	1,200	1	120
General factory, at $4.00 per direct labor-hour	1,000	4,000	40	160
Total overhead cost assigned (a)		$22,800		$ 850
Number of units produced (b)		4,000		100
Overhead cost per unit (a) ÷ (b)		$ 5.70		$8.50

The unit product costs combine direct materials, direct labor, and overhead costs as follows:

	J78	B52
Direct materials	$ 6.50	$31.00
Direct labor	3.75	6.00
Manufacturing overhead (see above)	5.70	8.50
Unit product cost	$15.95	$45.50

Exercise 4-7 (45 minutes)

1. The unit product costs under the company's conventional costing system would be computed as follows:

	Mercon	Wurcon	Total
Number of units produced (a)..	10,000	40,000	
Direct labor-hours per unit (b)...	0.20	0.25	
Total direct labor-hours (a) × (b).....................................	2,000	10,000	12,000

Total manufacturing overhead (a)	$336,000
Total direct labor-hours (b)..	12,000 DLHs
Predetermined overhead rate (a) ÷ (b)................................	$28.00 per DLH

	Mercon	Wurcon
Direct materials...	$10.00	$ 8.00
Direct labor	3.00	3.75
Manufacturing overhead applied:		
0.20 DLH per unit × $28.00 per DLH............................	5.60	
0.25 DLH per unit × $28.00 per DLH............................		7.00
Unit product cost..	$18.60	$18.75

Exercise 4-7 (continued)

2. The unit product costs with the proposed ABC system can be computed as follows:

Activity Cost Pool	Estimated Overhead Cost*	(b) Expected Activity	(a) ÷ (b) Activity Rate
Labor related	$168,000	12,000 direct labor-hours	$14.00 per direct labor-hour
Engineering design...............	168,000	8,000 engineering-hours	$21.00 per engineering-hour
	$336,000		

*The total manufacturing overhead cost is split evenly between the two activity cost pools.

Manufacturing overhead is assigned to the two products as follows:

	Mercon		Wurcon	
	Expected Activity	Amount	Expected Activity	Amount
Labor related, at $14.00 per direct labor-hour	2,000	$ 28,000	10,000	$140,000
Engineering design, at $21.00 per engineering-hour	4,000	84,000	4,000	84,000
Total overhead cost assigned (a)		$112,000		$224,000
Number of units produced (b)		10,000		40,000
Overhead cost per unit (a) ÷ (b)		$11.20		$5.60

The unit product costs combine direct materials, direct labor, and manufacturing overhead costs:

	Mercon	*Wurcon*
Direct materials	$10.00	$ 8.00
Direct labor	3.00	3.75
Manufacturing overhead (see above)	11.20	5.60
Unit product cost	$24.20	$17.35

3. The unit product cost of the high-volume product, Wurcon, declines under the activity-based costing system, whereas the unit product cost of the low-volume product, Mercon, increases. This occurs because half of the overhead is applied on the basis of engineering design-hours instead of direct labor-hours. When the overhead was applied on the basis of direct labor-hours, most of the overhead was applied to the high-volume product. However, when the overhead is applied on the basis of engineering-hours, more of the overhead cost is shifted over to the low-volume product. Engineering design is a product-level activity, so the higher the volume, the lower the unit cost and the lower the volume, the higher the unit cost.

Exercise 4-10 (30 minutes)

1. Under the traditional direct labor-hour based costing system, manufacturing overhead is applied to products using the predetermined overhead rate computed as follows:

$$\frac{\text{Predetermined}}{\text{overhead rate}} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total direct labor - hours}}$$

$$= \frac{\$2,200,000}{110,000 \text{ DLHs} *} = \$20.00 \text{ per DLH}$$

*25,000 units of Xactive @ 1.4 DLH per unit + 75,000 units of the Pathbreaker @ 1.0 DLH per unit = 35,000 DLHs + 75,000 DLHs = 110,000 DLHs

Consequently, the unit product costs using the traditional approach would be computed as follows:

	Xactive	*Pathbreaker*
Direct materials	$1,620,000	$3,825,000
Direct labor...	455,000	975,000
Manufacturing overhead applied @		
$20.00 per direct labor-hour	700,000	1,500,000
Total manufacturing cost (a)	$2,775,000	$6,300,000
Number of units (b)..........................	25,000	75,000
Unit product cost (a) ÷ (b).................	$111.00	$84.00

2. The activity rates are computed as follows:

Activity Cost Pools	*(a)* Total Cost	*(b)* Total Activity	*(a) ÷ (b)* Activity Rate
Supporting direct labor ...			
	$797,500	110,000 DLH	$7.25 per DLH
Batch setups....................	$680,000	400 setups	$1,700 per setup
Product sustaining...........	$650,000	2 products	$325,000 per product
General factory	$72,500	10,000 MHR	$7.25 Per MHR

3. Under the activity-based costing system, the unit product costs would be computed as follows:

	Xactive	*Pathbreaker*
Direct materials..............................	$1,620,000	$3,825,000
Direct labor.....................................	455,000	975,000
Supporting direct labor	253,750	543,750
Batch setups....................................	425,000	255,000
Product sustaining...........................	325,000	325,000
General factory	18,125	54,375
Total cost (a)...................................	$3,096,875	$5,978,125

Number of units (b)	25,000	75,000
Unit product cost (a) ÷ (b)	$123.88	$79.71

4. The traditional system uses one unit-level activity measure, direct labor hours, to assign 31.8% ($700,000 ÷ $2,200,000) of all overhead to the Xactive product line and 68.2% ($1,500,000 ÷ $2,200,000) of all overhead to the Pathbreaker product line. The ABC system assigns 62.5% ($425,000 ÷ $680,000) of Batch setup costs (a batch-level activity) to the Xactive product line and 37.5% ($255,000 ÷ $680,000) to the Pathbreaker product line. The ABC system assigns 50% ($325,000 ÷ $650,000) of Product sustaining costs (a product-level activity) to each product line.

Problem 4-14 (60 minutes)

1. The first step is to determine the activity rates:

	Serving a Party	*Serving a Diner*	*Serving Drinks*
Total cost (a)	$32,800	$211,200	$69,600
Total activity (b)	8,000 parties	32,000 diners	58,000 drinks
Cost per unit of activity (a)÷(b)	$4.10 per party	$6.60 per diner	$1.20 per drink

2. According to the ABC system, the cost of serving each of the parties can be computed as follows:

	Serving a Party	*Serving a Diner*	*Serving Drinks*
Cost per unit of activity.............	$4.10 per party	$6.60 per diner	$1.20 per drink

a. A party of four diners who order three drinks:

	1	*4*	*3*	
	party	*diners*	*drinks*	
Cost	$4.10	$26.40	$3.60	$34.10

b. A party of two diners who order no drinks:

	1	*2*	*0*

	party	*diners*	*drinks*	
Cost	$4.10	$13.20	$0.00	$17.30

c. A lone diner who orders two drinks:

	1	*1*	*2*	
	party	*diner*	*drinks*	
Cost	$4.10	$6.60	$2.40	$13.10

Problem 4-14 (continued)

3. The average cost per diner for each party can be computed by dividing the total cost of the party by the number of diners in the party as follows:

    a. $34.10 ÷ 4 diners = $8.53 per diner
    b. $17.30 ÷ 2 diners = $8.65 per diner
    c. $13.10 ÷ 1 diner = $13.10 per diner

4. The average cost per diner differs from party to party under the activity-based costing system for two reasons. First, the cost of serving a party ($4.10) does not depend on the number of diners in the party. Therefore, the average cost per diner of this activity decreases as the number of diners in the party increases. With only one diner, the cost is $4.10. With two diners, the average cost per diner is cut in half to $2.05. With four diners, the average cost per diner would be approximately $1.03. And so on. Second, the average cost per diner differs also because of the differences in the number of drinks ordered by the diners. If a party does not order any drinks, as was the case with the party of two, no costs of serving drinks are assigned to the party.

    The average cost per diner differs from the overall average cost of $9.80 per diner because the $9.80 per diner figure does not recognize differences in the diners' demands on resources. It does not recognize that some diners order more drinks than others nor does it recognize
that there are some economies of scale in serving larger parties. (The batch-level costs of serving a party can be spread over more diners if the party is larger.)

    We should note that the activity-based costing system itself does not recognize all of the differences in diners' demands on resources. For example, there are undoubtedly differences in the costs of preparing the various meals on the menu. It may or may not be worth the effort to build a more detailed activity-based costing system that would consider such nuances.