File: 16e\_GNB\_APP02A\_TB, Appendix 2A, Activity-Based Absorption Costing

**True/False**

**Multiple Choice**

Reference: APP02A-Ref1

(Appendix 2A) Feauto Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, I63E and E76I, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | I63E | E76I |
|  | Direct materials per unit | $19.90 | $54.40 |
|  | Direct labor per unit | $12.00 | $31.50 |
|  | Direct labor-hours per unit | 0.80 | 2.10 |
|  | Annual production (units) | 30,000 | 10,000 |

The company's estimated total manufacturing overhead for the year is $2,063,250 and the company's estimated total direct labor-hours for the year is 45,000.

The company is considering using a form of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Assembling products (DLHs) | $  720,000 |
|  | Preparing batches (batches) | 263,250 |
|  | Product support (product variations) | 1,080,000 |
|  | Total | $2,063,250 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Expected Activity | | |
|  |  | I63E | E76I | Total |
|  | DLHs | 24,000 | 21,000 | 45,000 |
|  | Batches | 1,080 | 675 | 1,755 |
|  | Product variations | 2,115 | 1,485 | 3,600 |

[QUESTION]

1. The manufacturing overhead that would be applied to a unit of product I63E under the company's traditional costing system is closest to:

A) $12.80

B) $39.35

C) $76.03

D) $36.68

Answer: D

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref1Feedback:

|  |  |  |
| --- | --- | --- |
|  | Product I63E 30,000 units × 0.80 direct labor-hours per unit | 24,000 |
|  | Product E76I 10,000 units × 2.10 direct labor-hours per unit | 21,000 |
|  | Total direct labor-hours | 45,000 |

Predetermined overhead rate = $2,063,250 ÷ 45,000 direct labor-hours = $45.85 per direct labor-hour

Overhead applied to a unit of product T37C = $45.85 per direct labor-hours × 0.80 direct labor-hours per unit = $36.68 per unit

[QUESTION]

2. The manufacturing overhead that would be applied to a unit of product E76I under the activity-based costing system is closest to:

A) $88.28

B) $96.29

C) $184.57

D) $10.13

Answer: A

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref1Feedback:

The activity rates for each activity cost pool are computed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Total Cost | Total Activity | | Activity Rate | |
|  | Assembling products | $720,000 | 45,000 | DLHs | $16 | per DLH |
|  | Preparing batches | $263,250 | 1,755 | batches | $150 | per batch |
|  | Product support | $1,080,000 | 3,600 | variations | $300 | per variation |

The overhead cost charged to Product E76I is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Activity Rate | | Activity | | ABC Cost |
|  | Assembling products | $16 | per DLH | 21,000 | DLHs | $336,000 |
|  | Preparing batches | $150 | per batch | 675 | batches | 101,250 |
|  | Product support | $300 | per variation | 1,485 | variations | 445,500 |
|  |  |  |  |  |  | $882,750 |

Manufacturing overhead applied to a unit of product E76I = $882,750 ÷ 10,000 units = $88.28 per unit

Reference: APP02A-Ref2

(Appendix 2A) Coudriet Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, P93S and N40S, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | P93S | N40S |
|  | Direct materials per unit | $21.90 | $54.80 |
|  | Direct labor per unit | $8.80 | $13.20a |
|  | Direct labor-hours per unit | 0.80 | 1.20 |
|  | Annual production (units) | 35,000 | 15,000 |

The company's estimated total manufacturing overhead for the year is $2,172,580 and the company's estimated total direct labor-hours for the year is 46,000.

The company is considering using a variation of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Direct labor support (DLHs) | $  552,000 |
|  | Setting up machines (setups) | 419,980 |
|  | Part administration (part types) | 1,200,600 |
|  | Total | $2,172,580 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Expected Activity | | |
|  |  | P93S | N40S | Total |
|  | DLHs | 28,000 | 18,000 | 46,000 |
|  | Setups | 2,162 | 1,656 | 3,818 |
|  | Part types | 1,886 | 2,116 | 4,002 |

[QUESTION]

3. The unit product cost of product P93S under the company's traditional costing system is closest to:

A) $68.48

B) $63.26

C) $30.70

D) $40.30

Answer: A

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref2Feedback:

Direct labor-hour calculation:

|  |  |  |
| --- | --- | --- |
|  | Product P93S 35,000 units × 0.80 direct labor-hours per unit | 28,000 |
|  | Product R28K 15,000 units × 1.20 direct labor-hours per unit | 18,000 |
|  | Total direct labor-hours | 46,000 |

Predetermined overhead rate = $2,172,580 ÷ 46,000 direct labor-hours = $47.23 per direct labor-hour

Overhead per unit of product P93S = $47.23 per direct labor-hour × 0.80 direct labor-hours per unit

= $37.78 per unit

|  |  |  |
| --- | --- | --- |
|  | Direct materials | $21.90 |
|  | Direct labor | 8.80 |
|  | Overhead | 37.78 |
|  | Unit product cost | $68.48 |

[QUESTION]

4. The unit product cost of product N40S under the activity-based costing system is closest to:

A) $68.00

B) $68.86

C) $124.68

D) $136.86

Answer: D

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref2Feedback:

The activity rates for each activity cost pool are computed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Total Cost | Total Activity | | Activity Rate | |
|  | Direct labor support | $552,000 | 46,000 | DLHs | $12 | per DLH |
|  | Setting up machines | $419,980 | 3,818 | per setup | $110 | per setup |
|  | Part administration | $1,200,600 | 4,002 | per part type | $300 | per part type |

The overhead cost charged to Product N40S is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Activity Rate | | Activity | | ABC Cost |
|  | Direct labor support | $12 | per DLH | 18,000 | DLHs | $216,000 |
|  | Setting up machines | $110 | per setup | 1,656 | per setup | 182,160 |
|  | Part administration | $300 | per part type | 2,116 | per part type | 634,800 |
|  |  |  |  |  |  | $1,032,960 |

Overhead cost per unit of Product N40S = $1,032,960 ÷ 15,000 units = $68.86 per unit

|  |  |  |
| --- | --- | --- |
|  | Direct materials | $54.80 |
|  | Direct labor | 13.20 |
|  | Overhead | 68.86 |
|  | Unit product cost | $136.86 |

Reference: APP02A-Ref3

(Appendix 2A) Poma Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, R78S and N32Y, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | R78S | N32Y |
|  | Direct materials per unit | $27.20 | $54.70 |
|  | Direct labor per unit | $8.80 | $22.00 |
|  | Direct labor-hours per unit | 0.4 | 1.0 |
|  | Annual production (units) | 35,000 | 10,000 |

The company's estimated total manufacturing overhead for the year is $1,427,040 and the company's estimated total direct labor-hours for the year is 24,000.

The company is considering using a variation of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Assembling products (DLHs) | $  672,000 |
|  | Preparing batches (batches) | 255,840 |
|  | Product support (product variations) | 499,200 |
|  | Total | $1,427,040 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Expected Activity | | |
|  |  | R78S | N32Y | Total |
|  | DLHs | 14,000 | 10,000 | 24,000 |
|  | Batches | 816 | 1,152 | 1,968 |
|  | Product variations | 840 | 408 | 1,248 |

[QUESTION]

5. The unit product cost of product R78S under the company's traditional costing system is closest to:

A) $36.00

B) $59.83

C) $47.20

D) $59.78

Answer: D

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref3Feedback:

Direct labor-hour calculation:

|  |  |  |
| --- | --- | --- |
|  | Product R78S 35,000 units × 0.4 direct labor-hours per unit | 14,000 |
|  | Product N32Y 10,000 units × 1.0 direct labor-hours per unit | 10,000 |
|  | Total direct labor-hours | 24,000 |

Predetermined overhead rate = $1,427,040 ÷ 24,000 direct labor-hours = $59.46 per direct labor-hour

Overhead applied to each unit of product R78S = $59.46 per direct labor-hour × 0.4 direct labor-hours per unit = $23.78 per unit

|  |  |  |
| --- | --- | --- |
|  | Direct materials | $27.20 |
|  | Direct labor | 8.80 |
|  | Overhead | 23.78 |
|  | Unit product cost | $59.78 |

[QUESTION]

6. The unit product cost of product N32Y under the activity-based costing system is closest to:

A) $136.00

B) $76.70

C) $59.30

D) $136.16

Answer: A

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref3Feedback:

The activity rates for each activity cost pool are computed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Total Cost | Total Activity | | Activity Rate | |
|  | Assembling products | $672,000 | 24,000 | DLHs | $28 | per DLH |
|  | Preparing batches | $255,840 | 1,968 | batches | $130 | per batch |
|  | Product support | $499,200 | 1,248 | variations | $400 | per variation |

The overhead cost charged to Product N32Y is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Activity Rate | | Activity | | ABC Cost |
|  | Assembling products | $28 | per DLH | 10,000 | DLHs | $280,000 |
|  | Preparing batches | $130 | per batch | 1,152 | batches | 149,760 |
|  | Product support | $400 | per variation | 408 | variations | 163,200 |
|  |  |  |  |  |  | $592,960 |

Overhead per unit of Product N32Y = $592,960 ÷ 10,000 units = $59.30 per unit

|  |  |  |
| --- | --- | --- |
|  | Direct materials | $54.70 |
|  | Direct labor | 22.00 |
|  | Overhead | 59.30 |
|  | Unit product cost | $136.00 |

Reference: APP02A-Ref4

(Appendix 2A) Adelberg Corporation makes two products: Product A and Product B. Annual production and sales are 500 units of Product A and 1,000 units of Product B. The company has traditionally used direct labor-hours as the basis for applying all manufacturing overhead to products. Product A requires 0.4 direct labor-hours per unit and Product B requires 0.2 direct labor-hours per unit. The total estimated overhead for next period is $68,756.

The company is considering switching to an activity-based costing system for the purpose of computing unit product costs for external reports. The new activity-based costing system would have three overhead activity cost pools--Activity 1, Activity 2, and General Factory--with estimated overhead costs and expected activity as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Estimated | Expected Activity | | |
|  | Activity Cost Pool | Overhead Costs | Product A | Product B | Total |
|  | Activity 1 | $31,031 | 1,000 | 300 | 1,300 |
|  | Activity 2 | 22,249 | 1,600 | 300 | 1,900 |
|  | General Factory | 15,476 | 200 | 200 | 400 |
|  | Total | $68,756 |  |  |  |

(Note: The General Factory activity cost pool's costs are allocated on the basis of direct labor-hours.)

[QUESTION]

7. The predetermined overhead rate under the traditional costing system is closest to:

A) $11.71

B) $38.69

C) $171.89

D) $23.87

Answer: C

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref4Feedback:

|  |  |  |
| --- | --- | --- |
|  | Product A 500 units × 0.4 direct labor-hours | 200 |
|  | Product B 1,000 units × 0.2 direct labor-hours | 200 |
|  | Total direct labor-hours | 400 |

Predetermined overhead rate = Total estimated overhead ÷ Total estimated direct labor-hours   
= $68,756 ÷ 400 direct labor-hours = $171.89 per direct labor-hour

[QUESTION]

8. The overhead cost per unit of Product B under the traditional costing system is closest to:

A) $2.34

B) $7.74

C) $4.77

D) $34.38

Answer: D

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref4Feedback:

Direct labor-hour calculation:

|  |  |  |
| --- | --- | --- |
|  | Product A 500 units × 0.4 direct labor-hours | 200 |
|  | Product B 1,000 units × 0.2 direct labor-hours | 200 |
|  | Total direct labor-hours | 400 |

Predetermined overhead rate = Total estimated overhead ÷ Total estimated direct labor-hours   
= $68,756 ÷ 400 direct labor-hours = $171.89 per direct labor-hour

Overhead cost per unit of B = $171.89 per direct labor-hour × 0.2 direct labor-hours per unit   
= $34.38 per unit

[QUESTION]

9. The predetermined overhead rate (i.e., activity rate) for Activity 2 under the activity-based costing system is closest to:

A) $13.91

B) $11.71

C) $74.16

D) $36.19

Answer: B

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref4Feedback:

Activity rate for Activity 2 = $22,249 ÷ 1,900 = $11.71

[QUESTION]

10. The overhead cost per unit of Product B under the activity-based costing system is closest to:

A) $45.84

B) $7.74

C) $34.38

D) $18.41

Answer: D

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref4Feedback:

The activity rates for each activity cost pool are computed as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Total Cost | Total Activity | Activity Rate |
|  | Activity 1 | $31,031 | 1,300 | $23.87 |
|  | Activity 2 | $22,249 | 1,900 | $11.71 |
|  | General Factory | $15,476 | 400 | $38.69 |

The overhead cost charged to Product B is:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Activity 1 | $23.87 | 300 | $7,161 |
|  | Activity 2 | $11.71 | 300 | 3,513 |
|  | General Factory | $38.69 | 200 | 7,738 |
|  |  |  |  | $18,412 |

Overhead cost per unit of Product B = $18,412 ÷ 1,000 units = $18.41 per unit

Reference: APP02A-Ref5

(Appendix 2A) Njombe Corporation manufactures a variety of products. In the past, Njombe has been using a traditional costing system in which the predetermined overhead rate was 150% of direct labor cost. Selling prices had been set by multiplying total product cost by 200%. Sensing that this system was distorting costs and selling prices, Njombe has decided to switch to an activity-based costing system for manufacturing overhead costs that uses the three activity cost pools listed below. Selling prices are still to be set at 200% of unit product cost under the new system. Information on these cost pools for next year are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Activity Cost Pool | Activity Measure | Estimated Activity | Estimated Overhead Cost |
|  | Machine Setups | Number of setups | 400 | $150,000 |
|  | Quality Control | Number of inspections | 1,500 | $180,000 |
|  | Other Overhead | Machine hours | 30,000 | $480,000 |

Information (on a per unit basis) related to three popular products at Njombe are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Model #19 | Model #36 | Model #58 |
|  | Direct material cost | $400 | $540 | $310 |
|  | Direct labor cost | $810 | $600 | $220 |
|  | Number of setups | 2 | 3 | 1 |
|  | Number of inspections | 1 | 3 | 1 |
|  | Number of machine hours | 4 | 8 | 10 |

[QUESTION]

11. Under the traditional costing system, what would be the selling price of one unit of Model #36?

A) $2,536

B) $2,712

C) $4,080

D) $5,506

Answer: C

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref5Feedback:

|  |  |  |
| --- | --- | --- |
|  | Direct materials | $540 |
|  | Direct labor | 600 |
|  | Manufacturing overhead (1.5 × $600) | 900 |
|  | Unit product cost | $2,040 |
|  | Selling price (2.00 × $2,040) | $4,080 |

[QUESTION]

12. Under the activity-based costing system, what would be the selling price of one unit of Model #36?

A) $2,536

B) $2,712

C) $4,080

D) $5,506

Answer: D

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref5Feedback:

The activity rates are computed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Activity Cost Pools | Total Cost | Total Activity | | Activity Rate | |
|  | Machine Setups | $150,000 | 400 | setups | $375 | per setup |
|  | Quality Control | $180,000 | 1,500 | inspections | $120 | per inspection |
|  | Other Overhead | $480,000 | 30,000 | machine-hours | $16 | per machine-hour |

The overhead cost charged to Model #36 is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Activity Cost Pools | Activity Rate | | Activity | | ABC Cost |
|  | Machine Setups | $375 | per setup | 3 | setups | $1,125 |
|  | Quality Control | $120 | per inspection | 3 | inspections | 360 |
|  | Other Overhead | $16 | per machine-hour | 8 | machine-hours | 128 |
|  | Total overhead cost |  |  |  |  | $1,613 |

|  |  |  |
| --- | --- | --- |
|  | Direct materials | $540 |
|  | Direct labor | 600 |
|  | Manufacturing overhead (1.5 × $600) | 1,613 |
|  | Unit product cost | $2,753 |
|  | Selling price (2.00 × $2,753) | $5,506 |

[QUESTION]

13. In comparing the traditional system with the activity-based costing system, which of Njombe's Models had higher unit product costs under the traditional system?

A) #19

B) #58

C) #19 and #58

D) #36 and #58

Answer: A

Difficulty: 3 Hard

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref5Feedback:

The activity rates are computed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Activity Cost Pools | Total Cost | Total Activity | | Activity Rate | |
|  | Machine Setups | $150,000 | 400 | setups | $375 | per setup |
|  | Quality Control | $180,000 | 1,500 | inspections | $120 | per inspection |
|  | Other Overhead | $480,000 | 30,000 | machine-hours | $16 | per machine-hour |

The overhead cost charged to Model #19 is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Activity Cost Pools | Activity Rate | | Activity | | ABC Cost |
|  | Machine Setups | $375 | per setup | 2 | setups | $750 |
|  | Quality Control | $120 | per inspection | 1 | inspections | 120 |
|  | Other Overhead | $16 | per machine-hour | 4 | machine-hours | 64 |
|  | Total overhead cost |  |  |  |  | $934 |

The overhead cost charged to Model # 36 is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Activity Cost Pools | Activity Rate | | Activity | | ABC Cost |
|  | Machine Setups | $375 | per setup | 3 | setups | $1,125 |
|  | Quality Control | $120 | per inspection | 3 | inspections | 360 |
|  | Other Overhead | $16 | per machine-hour | 8 | machine-hours | 128 |
|  | Total overhead cost |  |  |  |  | $1,613 |

The overhead cost charged to Model # 58 is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Activity Cost Pools | Activity Rate | | Activity | | ABC Cost |
|  | Machine Setups | $375 | per setup | 1 | setups | $375 |
|  | Quality Control | $120 | per inspection | 1 | inspections | 120 |
|  | Other Overhead | $16 | per machine-hour | 10 | machine-hours | 160 |
|  | Total overhead cost |  |  |  |  | $655 |

Traditional product costing overhead cost:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Model #19 | Model #36 | Model #58 |
|  | Direct labor cost | $810 | $600 | $220 |
|  | Overhead cost (150% of direct labor cost) | $1,125 | $900 | $330 |

The overhead costs are the only difference in unit product costs between the traditional costing system and the activity-based costing system. Therefore, Model #19 is the only product that has a higher unit product cost under the traditional system.

Reference: APP02A-Ref6

(Appendix 2A) Look Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, N06D and M09K, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | N06D | M09K |
|  | Direct materials per unit | $17.70 | $62.50 |
|  | Direct labor per unit | $5.00 | $16.00 |
|  | Direct labor-hours per unit | 0.50 | 1.60 |
|  | Annual production (units) | 40,000 | 15,000 |

The company's estimated total manufacturing overhead for the year is $2,532,200 and the company's estimated total direct labor-hours for the year is 44,000.

The company is considering using a variation of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Supporting direct labor (DLHs) | $  880,000 |
|  | Setting up machines (setups) | 376,200 |
|  | Parts administration (part types) | 1,276,000 |
|  | Total | $2,532,200 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Expected Activity | | |
|  |  | N06D | M09K | Total |
|  | DLHs | 20,000 | 24,000 | 44,000 |
|  | Setups | 1,408 | 1,100 | 2,508 |
|  | Part types | 1,540 | 1,012 | 2,552 |

[QUESTION]

14. The manufacturing overhead that would be applied to a unit of product N06D under the company's traditional costing system is closest to:

A) $28.78

B) $10.00

C) $63.31

D) $34.53

Answer: A

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref6Feedback:

Direct labor-hour calculation:

|  |  |  |
| --- | --- | --- |
|  | Product N06D 40,000 units × 0.50 direct labor-hours per unit | 20,000 |
|  | Product M09K 15,000 units × 1.60 direct labor-hours per unit | 24,000 |
|  | Total direct labor-hours | 44,000 |

Predetermined overhead rate = Total estimated overhead cost ÷ Total estimated direct labor-hours   
= $2,532,200 ÷ 44,000 direct labor-hours = $57.55 per direct labor-hour

Overhead applied to product N06D = $57.55 per direct labor-hour × 0.50 direct labor-hours per unit

= $28.78 per unit

[QUESTION]

15. The manufacturing overhead that would be applied to a unit of product M09K under the activity-based costing system is closest to:

A) $76.73

B) $92.08

C) $11.00

D) $168.81

Answer: A

Difficulty: 2 Medium

Learning Objective: 02-05Topic Area:Blooms: ApplyAACSB: Analytical ThinkingAICPA: BB Critical ThinkingAICPA: FN MeasurementRefer To: APP02A-Ref6Feedback:

The activity rates for each activity cost pool are computed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Total Cost | Total Activity | | Activity Rate | |
|  | Supporting direct labor | $880,000 | 44,000 | DLHs | $20 | per DLH |
|  | Setting up machines | $376,200 | 2,508 | setups | $150 | per setup |
|  | Parts administration | $1,276,000 | 2,552 | part types | $500 | per part type |

The overhead cost charged to Product M09K is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Activity Rate | | Activity | | ABC Cost |
|  | Supporting direct labor | $20 | per DLH | 24,000 | DLHs | $480,000 |
|  | Setting up machines | $150 | per setup | 1,100 | setups | 165,000 |
|  | Parts administration | $500 | per part type | 1,012 | part types | 506,000 |
|  |  |  |  |  |  | $1,151,000 |

Overhead applied to a unit of product M09K = $1,151,000 ÷ 15,000 units = $76.73 per unit

**Essay**

[QUESTION]

16. (Appendix 2A) Bullie Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, D31X and U75X, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | D31X | U75X |
|  | Direct materials per unit | $29.20 | $47.40 |
|  | Direct labor per unit | $1.10 | $23.10 |
|  | Direct labor-hours per unit | 0.10 | 2.10 |
|  | Annual production (units) | 35,000 | 15,000 |

The company's estimated total manufacturing overhead for the year is $1,147,650 and the company's estimated total direct labor-hours for the year is 35,000.

The company is considering using a variation of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Assembling products (DLHs) | $  140,000 |
|  | Preparing batches (batches) | 241,150 |
|  | Axial milling (MHs) | 766,500 |
|  | Total | $1,147,650 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | D31X | U75X | Total |
|  | Assembling products | 3,500 | 31,500 | 35,000 |
|  | Preparing batches | 560 | 1,295 | 1,855 |
|  | Axial milling | 1,540 | 1,015 | 2,555 |

Required:

a. Determine the manufacturing overhead cost per unit of each of the company's two products under the traditional costing system.

b. Determine the manufacturing overhead cost per unit of each of the company's two products under activity-based costing system.

Answer:

a. Traditional Manufacturing Overhead Costs

Predetermined overhead rate = Estimated total manufacturing overhead cost ÷ Estimated total amount of the allocation base = $1,147,650 ÷ 35,000 DLHs = $32.79 per DLH

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | D31X | U75X |
|  | Direct labor-hours | 0.10 | 2.10 |
|  | Predetermined overhead rate per DLH | $32.79 | $32.79 |
|  | Manufacturing overhead cost per unit | $3.28 | $68.86 |

b. ABC Manufacturing Overhead Costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Estimated Overhead Cost | Total Expected Activity | Activity Rate |
|  | Assembling products | $140,000 | 35,000 DLHs | $4 per DLH |
|  | Preparing batches | $241,150 | 1,855 batches | $130 per batch |
|  | Axial milling | $766,500 | 2,555 MHs | $300 per MH |

Overhead cost for D31X

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Assembling products | $4 per DLH | 3,500 DLHs | $14,000 |
|  | Preparing batches | $130 per batch | 560 batches | 72,800 |
|  | Axial milling | $300 per MH | 1,540 MHs | 462,000 |
|  | Total |  |  | $548,800 |
|  | Annual production (units) |  |  | 35,000 |
|  | Manufacturing overhead cost per unit |  |  | $15.68 |

Overhead cost for U75X

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Assembling products | $4 per DLH | 31,500 DLHs | $126,000 |
|  | Preparing batches | $130 per batch | 1,295 batches | 168,350 |
|  | Axial milling | $300 per MH | 1,015 MHs | 304,500 |
|  | Total |  |  | $598,850 |
|  | Annual production (units) |  |  | 15,000 |
|  | Manufacturing overhead cost per unit |  |  | $39.92 |

Difficulty: 2 Medium

Learning Objective: 02-05

Topic Area:

Blooms: Apply

AACSB: Analytical Thinking

AICPA: BB Critical Thinking

AICPA: FN Measurement

[QUESTION]

17. (Appendix 2A) Torri Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, B40W and C63J, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | B40W | C63J |
|  | Direct materials per unit | $34.90 | $63.70 |
|  | Direct labor per unit | $20.80 | $62.40 |
|  | Direct labor-hours per unit | 0.80 | 2.40 |
|  | Annual production (units) | 35,000 | 15,000 |

The company's estimated total manufacturing overhead for the year is $2,656,000 and the company's estimated total direct labor-hours for the year is 64,000.

The company is considering using a variation of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Assembling products (DLHs) | $1,216,000 |
|  | Preparing batches (batches) | 480,000 |
|  | Milling (MHs) | 960,000 |
|  | Total | $2,656,000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Activities | B40W | C63J | Total |
|  | Assembling products | 28,000 | 36,000 | 64,000 |
|  | Preparing batches | 2,304 | 2,496 | 4,800 |
|  | Milling | 1,088 | 2,112 | 3,200 |

Required:

a. Determine the unit product cost of each of the company's two products under the traditional costing system.

b. Determine the unit product cost of each of the company's two products under activity-based costing system.

Answer:

a. Traditional Unit Product Costs

Predetermined overhead rate = Estimated total manufacturing overhead cost ÷ Estimated total amount of the allocation base = $2,656,000 ÷ 64,000 DLHs = $41.50 per DLH

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | B40W | C63J |
|  | Direct materials | $34.90 | $63.70 |
|  | Direct labor | 20.80 | 62.40 |
|  | Manufacturing overhead  (0.8 DLHs × $41.50 per DLH; 2.4 DLHs × $41.50 per DLH) | 33.20 | 99.60 |
|  | Unit product cost | $88.90 | $225.70 |

b. ABC Unit Product Costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Estimated Overhead Cost | Total Expected Activity | Activity Rate |
|  | Assembling products | $1,216,000 | 64,000 DLHs | $19 per DLH |
|  | Preparing batches | $480,000 | 4,800 batches | $100 per setup |
|  | Milling | $960,000 | 3,200 MHs | $300 per MH |

Overhead cost for B40W

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Assembling products | $19 per DLH | 28,000 DLHs | $532,000 |
|  | Preparing batches | $100 per setup | 2,304 batches | 230,400 |
|  | Milling | $300 per MH | 1,088 MHs | 326,400 |
|  | Total |  |  | $1,088,800 |

Overhead cost for C63J

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Assembling products | $19 per DLH | 36,000 DLHs | $684,000 |
|  | Preparing batches | $100 per setup | 2,496 batches | 249,600 |
|  | Milling | $300 per MH | 2,112 MHs | 633,600 |
|  | Total |  |  | $1,567,200 |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | B40W | C63J |
|  | Direct materials | $34.90 | $63.70 |
|  | Direct labor | 20.80 | 62.40 |
|  | Manufacturing overhead  ($1,088,800 ÷ 35,000 units; $1,567,200 ÷ 15,000 units) | 31.11 | 104.48 |
|  | Unit product cost | $86.81 | $230.58 |

Difficulty: 2 Medium

Learning Objective: 02-05

Topic Area:

Blooms: Apply

AACSB: Analytical Thinking

AICPA: BB Critical Thinking

AICPA: FN Measurement

[QUESTION]

18. (Appendix 2A) Cabigas Corporation manufactures two products, Product C and Product D. The company estimated it would incur $167,140 in manufacturing overhead costs during the current period. Overhead currently is applied to the products on the basis of direct labor-hours. Data concerning the current period’s operations appear below:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Product C | Product D |
|  | Estimated volume | 2,000 units | 2,700 units |
|  | Direct labor-hours per unit | 2.00 hours | 0.80 hour |
|  | Direct materials cost per unit | $21.50 | $24.10 |
|  | Direct labor cost per unit | $24.00 | $9.60 |

Required:

a. Compute the predetermined overhead rate under the current method, and determine the unit product cost of each product for the current year.

b. The company is considering using an activity-based costing system to compute unit product costs for external financial reports instead of its traditional system based on direct labor-hours. The activity-based costing system would use three activity cost pools. Data relating to these activities for the current period are given below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Estimated | Expected Activity | | |
|  | Activity Cost Pool | Overhead Costs | Product C | Product D | Total |
|  | Machine setups | $ 13,630 | 130 | 160 | 290 |
|  | Purchase orders | 85,750 | 750 | 1,000 | 1,750 |
|  | General factory | 67,760 | 4,000 | 2,160 | 6,160 |
|  |  | $167,140 |  |  |  |

Determine the unit product cost of each product for the current period using the activity-based costing approach. General factory overhead is allocated based on direct labor-hours.

Answer:

a. The expected total direct labor-hours during the period are computed as follows:

|  |  |  |
| --- | --- | --- |
|  | Product C: 2,000 units × 2.0 hours per unit | 4,000 hours |
|  | Product D: 2,700 units × 0.8 hours per unit | 2,160 hours |
|  | Total direct labor-hours | 6,160 hours |

Using these hours as a base, the predetermined overhead using direct labor-hours would be:

Predetermined overhead rate = Estimated total overhead cost ÷ Estimated total direct labor-hours

= $167,140 ÷ 6,160 DLHs = $27.13 per DLH

Using this overhead rate, the unit product costs are:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Product C | Product D |
|  | Direct materials | $21.50 | $24.10 |
|  | Direct labor | 24.00 | 9.60 |
|  | Manufacturing overhead (2.0 DLHs × $27.13 per DLH; 0.8 DLHs × $27.13 per DLH) | 54.27 | 21.71 |
|  | Total unit product cost | $99.77 | $55.41 |

b. The activity rates for each activity cost pool are as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Estimated Overhead Cost | Expected Activity | | Activity Rate | |
|  | Machine setups | $13,630 | 290 | setups | $47.00 | per setup |
|  | Purchase orders | $85,750 | 1,750 | orders | $49.00 | per order |
|  | General factory | $67,760 | 6,160 | DLHs | $11.00 | per DLH |

The overhead cost charged to Product C is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Activity Rate | | Activity | | Amount |
|  | Machine setups | $53.00 | per setup | 130 | setups | $6,110 |
|  | Purchase orders | $38.00 | per order | 750 | orders | 36,750 |
|  | General factory | $13.00 | per DLH | 4,000 | DLHs | 44,000 |
|  | Total overhead cost |  |  |  |  | $86,860 |

The overhead cost charged to Product D is:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | Activity Rate | | Activity | | Amount |
|  | Machine setups | $53.00 | per setup | 160 | setups | $7,520 |
|  | Purchase orders | $38.00 | per order | 1,000 | orders | 49,000 |
|  | General factory | $13.00 | per DLH | 2,160 | DLHs | 23,760 |
|  | Total overhead cost |  |  |  |  | $80,280 |

Overhead cost per unit:

Product C: $86,860 ÷ 2,000 units = $43.43 per unit.

Product D: $80,280 ÷ 2,700 units = $29.73 per unit.

Using activity based costing, the unit product cost of each product would be:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Product C | Product D |
|  | Direct materials | $21.50 | $24.10 |
|  | Direct labor | 24.00 | 9.60 |
|  | Manufacturing overhead | 43.43 | 29.73 |
|  | Total unit product cost | $88.93 | $63.43 |

Difficulty: 3 Hard

Learning Objective: 02-05

Topic Area:

Blooms: Apply

AACSB: Analytical Thinking

AICPA: BB Critical Thinking

AICPA: FN Measurement

[QUESTION]

19. (Appendix 2A) Welk Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, H16Z and P25P, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | H16Z | P25P |
|  | Direct materials per unit | $10.20 | $50.50 |
|  | Direct labor per unit | $8.40 | $25.20 |
|  | Direct labor-hours per unit | 0.40 | 1.20 |
|  | Annual production (units) | 30,000 | 10,000 |

The company's estimated total manufacturing overhead for the year is $1,464,480 and the company's estimated total direct labor-hours for the year is 24,000.

The company is considering using a variation of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Supporting direct labor (DLHs) | $  552,000 |
|  | Setting up machines (setups) | 132,480 |
|  | Parts administration (part types) | 780,000 |
|  | Total | $1,464,480 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | H16Z | P25P | Total |
|  | Supporting direct labor | 12,000 | 12,000 | 24,000 |
|  | Setting up machines | 864 | 240 | 1,104 |
|  | Parts administration | 600 | 960 | 1,560 |

Required:

a. Determine the manufacturing overhead cost per unit of each of the company's two products under the traditional costing system.

b. Determine the manufacturing overhead cost per unit of each of the company's two products under activity-based costing system.

Answer:

a. Traditional Manufacturing Overhead Costs

Predetermined overhead rate = Estimated total manufacturing overhead cost ÷ Estimated total amount of the allocation base = $1,464,480 ÷ 24,000 DLHs = $61.02 per DLH

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | H16Z | P25P |
|  | Direct labor-hours | 0.40 | 1.20 |
|  | Predetermined overhead rate per DLH | $61.02 | $61.02 |
|  | Manufacturing overhead cost per unit | $24.41 | $73.22 |

b. ABC Manufacturing Overhead Costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Estimated Overhead Cost | Total Expected Activity | Activity Rate |
|  | Supporting direct labor | $552,000 | 24,000 DLHs | $23 per DLH |
|  | Setting up machines | $132,480 | 1,104 setups | $120 per setup |
|  | Parts administration | $780,000 | 1,560 part types | $500 per part type |

Overhead cost for H16Z

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Supporting direct labor | $23 per DLH | 12,000 DLHs | $276,000 |
|  | Setting up machines | $120 per setup | 864 setups | 103,680 |
|  | Parts administration | $500 per part type | 600 part types | 300,000 |
|  | Total |  |  | $679,680 |
|  | Annual production (units) |  |  | 30,000 |
|  | Manufacturing overhead cost per unit |  |  | $22.66 |

Overhead cost for P25P

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Supporting direct labor | $23 per DLH | 12,000 DLHs | $276,000 |
|  | Setting up machines | $120 per setup | 240 setups | 28,800 |
|  | Parts administration | $500 per part type | 960 part types | 480,000 |
|  | Total |  |  | $784,800 |
|  | Annual production (units) |  |  | 10,000 |
|  | Manufacturing overhead cost per unit |  |  | $78.48 |

Difficulty: 2 Medium

Learning Objective: 02-05

Topic Area:

Blooms: Apply

AACSB: Analytical Thinking

AICPA: BB Critical Thinking

AICPA: FN Measurement

[QUESTION]

20. (Appendix 2A) Werger Manufacturing Corporation has a traditional costing system in which it applies manufacturing overhead to its products using a predetermined overhead rate based on direct labor-hours (DLHs). The company has two products, W82R and L48S, about which it has provided the following data:

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | W82R | L48S |
|  | Direct materials per unit | $11.50 | $62.90 |
|  | Direct labor per unit | $2.00 | $13.00 |
|  | Direct labor-hours per unit | 0.20 | 1.30 |
|  | Annual production (units) | 45,000 | 10,000 |

The company's estimated total manufacturing overhead for the year is $1,521,960 and the company's estimated total direct labor-hours for the year is 22,000.

The company is considering using a variation of activity-based costing to determine its unit product costs for external reports. Data for this proposed activity-based costing system appear below:

|  |  |  |
| --- | --- | --- |
|  | Activities and Activity Measures | Estimated Overhead Cost |
|  | Supporting direct labor (DLHs) | $  352,000 |
|  | Setting up machines (setups) | 201,960 |
|  | Parts administration (part types) | 968,000 |
|  | Total | $1,521,960 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Activities | W82R | L48S | Total |
|  | Supporting direct labor | 9,000 | 13,000 | 22,000 |
|  | Setting up machines | 814 | 374 | 1,188 |
|  | Parts administration | 924 | 1,012 | 1,936 |

Required:

a. Determine the unit product cost of each of the company's two products under the traditional costing system.

b. Determine the unit product cost of each of the company's two products under activity-based costing system.

Answer:

a. Traditional Unit Product Costs

Predetermined overhead rate = Estimated total manufacturing overhead cost ÷ Estimated total amount of the allocation base = $1,521,960 ÷ 22,000 DLHs = $69.18 per DLH

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | W82R | L48S |
|  | Direct materials | $11.50 | $62.90 |
|  | Direct labor | 2.00 | 13.00 |
|  | Manufacturing overhead  (0.2 DLHs × $69.18 per DLH; 1.3 DLHs × $69.18 per DLH) | 13.84 | 89.93 |
|  | Unit product cost | $27.34 | $165.83 |

b. ABC Unit Product Costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Estimated Overhead Cost | Total Expected Activity | Activity Rate |
|  | Supporting direct labor | $352,000 | 22,000 DLHs | $16 per DLH |
|  | Setting up machines | $201,960 | 1,188 setups | $170 per setup |
|  | Parts administration | $968,000 | 1,936 part types | $500 per part type |

Overhead cost for W82R

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Supporting direct labor | $16 per DLH | 9,000 DLHs | $144,000 |
|  | Setting up machines | $170 per setup | 814 setups | 138,380 |
|  | Parts administration | $500 per part type | 924 part types | 462,000 |
|  | Total |  |  | $744,380 |

Overhead cost for L48S

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Activity Rate | Activity | ABC Cost |
|  | Supporting direct labor | $16 per DLH | 13,000 DLHs | $208,000 |
|  | Setting up machines | $170 per setup | 374 setups | 63,580 |
|  | Parts administration | $500 per part type | 1,012 part types | 506,000 |
|  | Total |  |  | $777,580 |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | W82R | L48S |
|  | Direct materials | $11.50 | $62.90 |
|  | Direct labor | 2.00 | 13.00 |
|  | Manufacturing overhead  ($744,400 ÷ 45,000 units; $777,600 ÷ 10,000 units) | 16.54 | 77.76 |
|  | Unit product cost | $30.04 | $153.66 |

Difficulty: 2 Medium

Learning Objective: 02-05

Topic Area:

Blooms: Apply

AACSB: Analytical Thinking

AICPA: BB Critical Thinking

AICPA: FN Measurement