## Problem 12A-4 (60 minutes)

1. From the standpoint of the selling division, Alpha Division:

 $\begin{aligned} \text{Transfer price} \geq & \frac{\text{Variable cost}}{\text{per unit}} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}} \\ \text{Transfer price} \geq & \left(\$18 - \$2\right) + \frac{(\$30 - \$18) \times 5,000}{5,000} = \$16 + \$12 = \$28 \end{aligned}$ 

But, from the standpoint of the buying division, Beta Division:

Transfer price  $\leq$  Cost of buying from outside supplier = \$27

Beta Division won't pay more than \$27 and Alpha Division will not accept less than \$28, so no deal is possible. There will be no transfer.

2. a. From the standpoint of the selling division, Alpha Division:

 $\begin{aligned} \text{Transfer price} \geq & \frac{\text{Variable cost}}{\text{per unit}} + \frac{\text{Total contribution margin on lost sales}}{\text{Number of units transferred}} \\ \text{Transfer price} \geq & (\$65 - \$5) + \frac{(\$90 - \$65) \times 30,000}{30,000} = \$60 + \$25 = \$85 \end{aligned}$ 

From the standpoint of the buying division, Beta Division:

Transfer price  $\leq$  Cost of buying from outside supplier = \$89

In this instance, an agreement is possible within the range:

 $85 \leq Transfer price \leq 889$ 

Even though both managers would be better off with *any* transfer price within this range, they may disagree about the exact amount of the transfer price. It would not be surprising to hear the buying division arguing strenuously for \$85 while the selling division argues just as strongly for \$89.

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## Problem 12A-4 (continued)

b. The loss in potential profits to the company as a whole will be:

Beta Division's outside purchase price	\$89
Alpha Division's variable cost on the internal transfer	<u>    85    </u>
Potential added contribution margin lost to the	
company as a whole	\$ 4
Number of units	<u>× 30,000</u>
Potential added contribution margin and company	
profits forgone	<u>\$120,000</u>

Another way to derive the same answer is to look at the loss in potential profits for each division and then total the losses for the impact on the company as a whole. The loss in potential profits in Alpha Division will be:

Suggested selling price per unit	\$88
Alpha Division's variable cost on the internal transfer	<u>    85    </u>
Potential added contribution margin per unit	\$ 3
Number of units	<u>× 30,000</u>
Potential added contribution margin and divisional	
profits forgone	<u>\$90,000</u>
The loss in potential profits in Beta Division will be:	
Outside purchase price per unit	\$89
Suggested price per unit inside	88
Potential cost avoided per unit	\$ 1
Number of units	<u>× 30,000</u>
Potential added contribution margin and divisional	
profits forgone	<u>\$30,000</u>

The total of these two amounts equals the \$120,000 loss in potential profits for the company as a whole.

3. a. From the standpoint of the selling division, Alpha Division:

 $\begin{array}{l} \mbox{Transfer price} \geq \frac{\mbox{Variable cost}}{\mbox{per unit}} + \frac{\mbox{Total contribution margin on lost sales}}{\mbox{Number of units transferred}} \\ \mbox{Transfer price} \geq \$40 + \frac{\$0}{20,000} = \$40 \end{array}$ 

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## Problem 12A-4 (continued)

From the standpoint of the buying division, Beta Division:

Transfer price  $\leq$  Cost of buying from outside supplier

Transfer price  $\leq$  \$75 - (0.08 × \$75) = \$69

In this case, an agreement is possible within the range:

 $40 \leq \text{Transfer price} \leq 69$ 

If the managers understand what they are doing and are reasonably cooperative, they should be able to come to an agreement with a transfer price within this range.

b. Alpha Division's ROI should increase. The division has idle capacity, so selling 20,000 units a year to Beta Division should cause no increase in the division's operating assets. Therefore, Alpha Division's turnover should increase. The division's margin should also increase, because its contribution margin will increase by \$400,000 as a result of the new sales, with no offsetting increase in fixed costs:

Selling price	\$60
Variable costs	<u>40</u>
Contribution margin	\$20
Number of units	<u>× 20,000</u>
Added contribution margin	\$400,000

Thus, with both the margin and the turnover increasing, the division's ROI would also increase.

4. From the standpoint of the selling division, Alpha Division:

 $\begin{array}{l} \mbox{Transfer price} \geq \mbox{Variable cost} \ + \ \frac{\mbox{Total contribution margin on lost sales}}{\mbox{Number of units transferred}} \\ \mbox{Transfer price} \geq \mbox{\$21} \ + \ \frac{\mbox{(\$50 - \$26)} \times \mbox{\$5,000}}{\mbox{120,000}} \ = \ \mbox{\$21} \ + \ \mbox{\$9} \ = \ \mbox{\$30} \end{array}$ 

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