EXERCISE 10-28 (15 MINUTES)

Direct-material price variance \[= PQ(AP - SP)\]
\[= 6,500(7.40 - 7.20)\]
\[= 1,300\] Unfavorable

Direct-material quantity variance \[= SP(AQ - SQ)\]
\[= 7.20(4,300* - 4,000†)\]
\[= 2,160\] Unfavorable

\[*AQ = 4,300\] pounds = $31,820 + $7.40 per pound

\[†SQ = 4,000\] pounds = 2,000 units \times 2 pounds per unit

Direct-labor rate variance \[= AH(AR - SR)\]
\[= 6,450*(18.30 - 18.00)\]
\[= 1,935\] Unfavorable

\[*AH = 6,450\] hours = $118,035 + $18.30 per hour

Direct-labor efficiency variance \[= SR(AH - SH)\]
\[= 18(6,450 - 6,000*)\]
\[= 8,100\] Unfavorable

\[*SH = 6,000\] hours = 2,000 units \times 3 hours per unit

EXERCISE 10-30 (10 MINUTES)

Standard quantity:
- Hardwood in finished product .................................................. 7 board feet
- Allowance for normal scrap ..................................................... 1.5 board feet
- Total standard quantity required per box ................................. 8.5 board feet

Standard price:
- Purchase price per board foot of hardwood ........................... $ 5.00
- Transportation cost per board foot ........................................... 1.20
- Total standard price per board foot ................................. $ 6.20
Standard direct-material cost of a jewelry box:

- Standard quantity: 8.5 board feet
- Price per board foot: $6.20
- Standard direct-material cost: $52.70

EXERCISE 10-31 (15 MINUTES)

1. Calculation of variances:

   **Direct-material price variance**
   \[ PQ(AP - SP) = 240,000(0.62 - 0.60) = 4,800 \text{ Unfavorable} \]

   **Direct-material quantity variance**
   \[ SP(AQ - SQ) = 0.60(210,000 - 200,000) = 6,000 \text{ Unfavorable} \]

   *SQ = 200,000 kilograms = 50,000 units \times 4 kilograms per unit

   **Direct-labor rate variance**
   \[ AH(AR - SR) = 13,000(12.20 - 12.00) = 2,600 \text{ Unfavorable} \]

   *AR = $158,600 \div 13,000 \text{ hours} \]

   **Direct-labor efficiency variance**
   \[ SR(AH - SH) = 12.00(13,000 - 12,500) = 6,000 \text{ Unfavorable} \]

   *SH = 12,500 hours = 50,000 units \times 0.25 \text{ hours per unit} \]

EXERCISE 10-31 (CONTINUED)

2. In the electronic version of the solutions manual, press the CTRL key and click on the following link: **BUILD A SPREADSHEET**

EXERCISE 10-38 (10 MINUTES)

1. Manufacturing cycle efficiency (MCE):

   \[ \text{MCE} = \frac{\text{processing time}}{\text{processing time + inspection time + waiting time + move time}} \]
2. Delivery cycle time is the average time between receipt of the customer’s order until delivery of the goods. In this case the delivery cycle time is 44 days.

PROBLEM 10-43 (25 MINUTES)

1. Direct-material price variance = \((PQ \times AP) - (PQ \times SP)\)
   
   \[
   = (36,000 \times $1.38) - (36,000 \times $1.35) \\
   = $49,680 - $48,600 \\
   = $1,080 \text{ Unfavorable}
   \]

2. Direct-material quantity variance = \((AQ \times SP) - (SQ \times SP)\)

   \[
   = (19,000 \times $1.35) - (20,000 \times $1.35) \\
   = $25,650 - $27,000 \\
   = $1,350 \text{ Favorable}
   \]

   *1,000 units \times 20 \text{ yards per unit} = 20,000 \text{ yards}

3. Direct-labor rate variance = \((AH \times AR) - (AH \times SR)\)

   \[
   = (4,200 \times $9.15) - (4,200 \times $9.00) \\
   = $38,430 - $37,800 \\
   = $630 \text{ Unfavorable}
   \]

4. Direct-labor efficiency variance = \((AH \times SR) - (SH \times SR)\)

   \[
   = (4,200 \times $9.00) - (4,000 \times $9.00) \\
   = $37,800 - $36,000 \\
   = $1,800 \text{ Unfavorable}
   \]

   *1,000 units \times 4 \text{ hours per unit} = 4,000 \text{ hours}
1. Schedule of standard production costs:

**Valport Valve Company: Shreveport Plant**

**Schedule of Standard Production Costs: Based on 15,600 Units For the Month of March**

<table>
<thead>
<tr>
<th></th>
<th>Standard Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>15,600 units × 3 lbs. × $5.00 = $234,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>15,600 units × 5 hrs. × $11.25 = 877,500</td>
</tr>
<tr>
<td>Total standard production costs</td>
<td><strong>$1,111,500</strong></td>
</tr>
</tbody>
</table>

2. Variances:
   a. Direct-material price variance = \((PQ \times AP) – (PQ \times SP)\)
      = \((50,000 \times $5.20) – (50,000 \times $5.00)\)
      = $10,000 Unfavorable
   b. Direct-material quantity variance = \((AQ \times SP) – (SQ \times SP)\)
      = \((46,200 \times $5.00) – (46,800* \times $5.00)\)
      = $3,000 Favorable
      
      *15,600 units × 3 lbs. per unit = 46,800 lb.
   c. Direct-labor rate variance = \((AH \times AR) – (AH \times SR)\)
      = \((80,200 \times $10.95) – (80,200 \times $11.25)\)
      = $24,060 Favorable
   d. Direct-labor efficiency variance = \((AH \times SR) – (SH \times SR)\)
      = \((80,200 \times $11.25) – (78,000* \times $11.25)\)
      = $24,750 Unfavorable
      
      *15,600 units × 5 hours per unit = 78,000 hr.

3. In the electronic version of the solutions manual, press the CTRL key and click on the following link: BUILD A SPREADSHEET