Solid carbon combines with dioxygen gas to make gaseous carbon monoxide. How many grams of carbon monoxide can be made from 11.2 L of dioxygen (measured at STP)?

Atomic masses: C = 12.0, O = 16.0

Conversion factors:  
- \((PT)\) g chemical \(\frac{1}{1}\) mol chemical  
- 22.4 L gas \(\frac{1}{1}\) mol gas  
- \(6.02 \times 10^{23}\) molecules chemical \(\frac{1}{1}\) mol chemical

Write STEP 1 in this box, then SHOW how to DO STEP 1 in the box BELOW.

STEP 1

STEP 2

Write STEP 2 in this box, then SHOW how to DO STEP 2 in the box ABOVE.

Write STEP 3 in this box, then SHOW how to do STEP 3 in the boxes below

Write STEP 4 in this box, then add the factor for step 4 below

Write STEP 5 in this box, then add the factor for step 5 below

ANSWER (use correct sig figs, unit, and chemical).
**QUIZ: 5-STEMPS OF STOICHIOMETRY**

**Write the instructions for each step in the box labeled for that step. Show how to do each step in the box labeled “Do step N here.” Make certain EACH VALUE give the numerals, units, and chemical. Use the proper designation for the STATE of each chemical in the balanced equation.**

Dihydrogen gas combines with dioxygen gas to make liquid water. How many liters of dioxygen (measured at STP) are needed to make 27.0 g of water?

**Atomic masses:**  
\[ H = 1.00 \quad O = 16.0 \]

**Conversion factors:**  
\[ \begin{align*} 
(\text{PT}) \ g \text{ chemical} & \quad 22.4 \ L \text{ gas} & \quad 6.02 \times 10^{23} \text{ molecules chemical} \\
1 \text{ mol chemical} & \quad 1 \text{ mol gas} & \quad 1 \text{ mol chemical} 
\end{align*} \]

<table>
<thead>
<tr>
<th>Write STEP 1 in this box, then SHOW how to DO STEP 1 in the box BELOW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>STEP 1</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>STEP 2</strong></td>
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<tr>
<td>Write STEP 2 in this box, then SHOW how to DO STEP 2 in the box ABOVE.</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Write STEP 3 in this box, then SHOW how to do STEP 3 in the boxes below</td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

**ANSWER (use correct sig figs, unit, and chemical).**

---

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### Balance Chemical Equation 1

**STEP 1**

Balance chemical equation

\[ 2 \text{ C (s) } + \text{ O}_2 (g) \rightarrow 2 \text{ CO (g)} \]

**STEP 2**

11.2 L g?

**Write STEP 2**

Identify unknown and given

<table>
<thead>
<tr>
<th>Write STEP 3 in this box,</th>
<th>Write STEP 4 in this box,</th>
<th>Write STEP 5 in this box,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change given to moles</td>
<td>Multiply by eqn. ratio: unknown given</td>
<td>Change unknown moles to lab measure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11.2 L O(_2)</th>
<th>1 mol O(_2)</th>
<th>O(_2)</th>
<th>28.0 g CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.4 L O(_2)</td>
<td>X</td>
<td>2 CO</td>
<td>1 mol CO</td>
</tr>
</tbody>
</table>

ANSWER (use correct sig figs, unit, and chemical).

7.00 g CO

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### Balance Chemical Equation 2

**STEP 1**

Balance chemical equation

\[ 2 \text{ H}_2 (g) + \text{ O}_2 (g) \rightarrow 2 \text{ H}_2\text{O (l)} \]

**STEP 2**

L? 27.0 g

**Write STEP 2**

Identify unknown and given

<table>
<thead>
<tr>
<th>Write STEP 3 in this box,</th>
<th>Write STEP 4 in this box,</th>
<th>Write STEP 5 in this box,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change given to moles</td>
<td>Multiply by eqn. ratio: unknown given</td>
<td>Change unknown moles to lab measure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>27.0gH(_2)O</th>
<th>1 mol H(_2)O</th>
<th>O(_2)</th>
<th>22.4 L O(_2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.0gH(_2)O</td>
<td>X</td>
<td>2 H(_2)O</td>
<td>1 mol O(_2)</td>
</tr>
</tbody>
</table>

ANSWER (use correct sig figs, unit, and chemical).

5.60 L O\(_2\)
When heated, calcium carbonate decomposes to calcium oxide and carbon dioxide. How many liters of carbon dioxide (measured at RTP) can be made from 25.0 g of calcium carbonate?

Atomic masses: C = 12.0, O = 16.0, Ca = 40.0

Conversion factors: (PT) g chemical 22.4 L gas 6.02 x 10^{23} \text{ molecules chemical}

1 mol chemical 1 mol gas 1 mol chemical

Write STEP 1 in this box, then SHOW how to DO STEP 1 in the box BELOW

STEP 1

STEP 2

Write STEP 2 in this box, then SHOW how to DO STEP 2 in the box ABOVE.

Write STEP 3 in this box, then SHOW how to do STEP 3 in the boxes below

Write STEP 4 in this box, then add the factor for step 4 below

Write STEP 5 in this box, then add the factor for step 5 below

ANSWER (use correct sig figs, unit, and chemical).
ANSWER TO MAKEUP:

6.10 L CaO