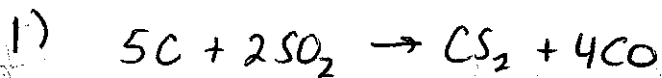


ANSWER KEY - LIMITING REACTANTS



$$\frac{17.5g C \mid 1 \text{ mol C} \mid 1 \text{ mol CS}_2}{12.0g C \mid 5 \text{ mol C}} = 0.292 \text{ mol CS}_2 \quad / \quad \frac{39.5g SO_2 \mid 1 \text{ mol} \mid 1 \text{ mol CS}_2}{64.1g \mid 2 \text{ mol SO}_2} = 0.308 \text{ mol CS}_2$$

∴ C is the limiting reactant
SO₂ is in excess.

mass of CS₂ produced:

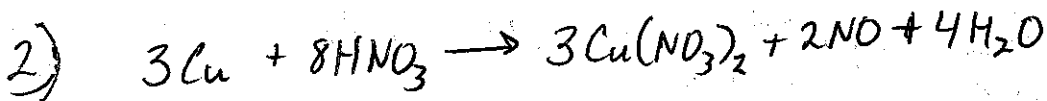
$$\frac{0.292 \text{ mol} \mid 76.1g CS_2}{1 \text{ mol CS}_2} = 22.2g CS_2$$

mass of SO₂ used in rxn:

limiting reactant → $\frac{17.5g C \mid 1 \text{ mol C} \mid 2 \text{ mol SO}_2 \mid 64.1g SO_2}{12.0g C \mid 5 \text{ mol C} \mid 1 \text{ mol SO}_2} = 37.4g SO_2 \text{ used}$

mass SO₂ left over:

$$39.5g - 37.4g = 2.1g SO_2$$



$$\frac{87.0g Cu \mid 1 \text{ mol Cu} \mid 2 \text{ mol NO}}{63.5g Cu \mid 3 \text{ mol Cu}} = 0.913 \text{ mol NO}$$

$$\frac{225g HNO_3 \mid 1 \text{ mol HNO}_3 \mid 2 \text{ mol NO}}{63.0g HNO_3 \mid 8 \text{ mol HNO}_3} = 0.893 \text{ mol NO}$$

∴ HNO₃ is the limiting reactant
Cu is in excess.

OVER. ①

mass NO produced:

$$\frac{0.893 \text{ mol NO} \mid 30.0 \text{ g NO}}{1 \text{ mol NO}} = 26.8 \text{ g NO}$$

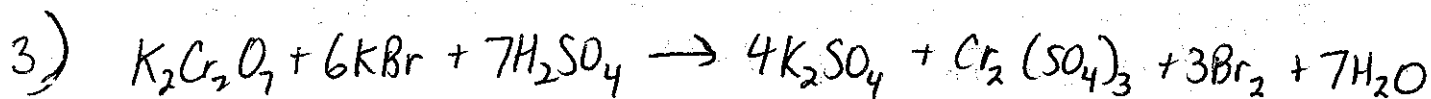
mass Cu used in rxn:

limiting reactant \rightarrow

$$\frac{225 \text{ g HNO}_3 \mid 1 \text{ mol HNO}_3 \mid 3 \text{ mol Cu} \mid 63.5 \text{ g Cu}}{63.0 \text{ g} \mid 8 \text{ mol HNO}_3 \mid 1 \text{ mol Cu}} = 85.0 \text{ g Cu}$$

mass Cu left over:

$$87.0 \text{ g} - 85.0 \text{ g} = 2.0 \text{ g Cu}$$



$$\frac{25.0 \text{ g K}_2\text{Cr}_2\text{O}_7 \mid 1 \text{ mol K}_2\text{Cr}_2\text{O}_7 \mid 3 \text{ mol Br}_2}{294.2 \text{ g K}_2\text{Cr}_2\text{O}_7 \mid 1 \text{ mol K}_2\text{Cr}_2\text{O}_7} = 0.255 \text{ mol Br}_2$$

$$\frac{55.0 \text{ g KBr} \mid 1 \text{ mol KBr} \mid 3 \text{ mol Br}_2}{119.0 \text{ g KBr} \mid 6 \text{ mol KBr}} = 0.231 \text{ mol Br}_2$$

$$\frac{60.0 \text{ g H}_2\text{SO}_4 \mid 1 \text{ mol H}_2\text{SO}_4 \mid 3 \text{ mol Br}_2}{98.1 \text{ g H}_2\text{SO}_4 \mid 7 \text{ mol H}_2\text{SO}_4} = 0.262 \text{ mol Br}_2$$

\therefore KBr is the limiting reactant and $\text{K}_2\text{Cr}_2\text{O}_7$ and H_2SO_4 are in excess

mass Br_2 produced:

$$\frac{0.231 \text{ mol Br}_2 \mid 159.8 \text{ g Br}_2}{1 \text{ mol Br}_2} = 36.9 \text{ g Br}_2$$

mass of $\text{K}_2\text{Cr}_2\text{O}_7$ and H_2SO_4 used in rxn:

limiting reactant

$$\frac{55.0 \text{ g KBr} \mid 1 \text{ mol KBr} \mid 1 \text{ mol K}_2\text{Cr}_2\text{O}_7 \mid 294.2 \text{ g K}_2\text{Cr}_2\text{O}_7}{119.0 \text{ g KBr} \mid 6 \text{ mol KBr} \mid 1 \text{ mol K}_2\text{Cr}_2\text{O}_7} = 22.7 \text{ g K}_2\text{Cr}_2\text{O}_7$$

$$\frac{55.0 \text{ g KBr} \mid 1 \text{ mol KBr} \mid 7 \text{ mol H}_2\text{SO}_4 \mid 98.1 \text{ g H}_2\text{SO}_4}{119.0 \text{ g KBr} \mid 6 \text{ mol KBr} \mid 1 \text{ mol H}_2\text{SO}_4} = 52.9 \text{ g H}_2\text{SO}_4$$

mass of $\text{K}_2\text{Cr}_2\text{O}_7$ and H_2SO_4 left over:

$$\text{mass K}_2\text{Cr}_2\text{O}_7 \text{ left} = 25.0 \text{ g} - 22.7 \text{ g} = 2.3 \text{ g}$$

$$\text{mass H}_2\text{SO}_4 \text{ left} = 60.0 \text{ g} - 52.9 \text{ g} = 7.1 \text{ g}$$

$$4) \frac{0.0250 \text{ L C}_5\text{H}_{12} \mid 626.0 \text{ g C}_5\text{H}_{12} \mid 1 \text{ mol C}_5\text{H}_{12} \mid 5 \text{ mol CO}_2}{1 \text{ L C}_5\text{H}_{12} \mid 72.0 \text{ g C}_5\text{H}_{12} \mid 1 \text{ mol C}_5\text{H}_{12}} = 1.09 \text{ mol CO}_2$$

$$\frac{40.0 \text{ L O}_2 \mid 1 \text{ mol} \mid 5 \text{ mol CO}_2}{22.4 \text{ L} \mid 8 \text{ mol O}_2} = 1.12 \text{ mol CO}_2$$

∴ C_5H_{12} is the limiting reactant.

Volume CO_2 produced:

$$\frac{1.09 \text{ mol CO}_2 \mid 22.4 \text{ L CO}_2}{1 \text{ mol CO}_2} = 24.4 \text{ L CO}_2$$

OVER

(3)

Handwritten text at the top right of the page.

Handwritten text in the upper middle section of the page.

Small handwritten mark or symbol on the right side.

Handwritten text in the middle section of the page.

Handwritten text in the first column of the table.	Handwritten text in the second column of the table.	Handwritten text in the third column of the table.	Handwritten text in the fourth column of the table.
Handwritten text in the first column of the table.	Handwritten text in the second column of the table.	Handwritten text in the third column of the table.	Handwritten text in the fourth column of the table.

Handwritten text below the first table.

Handwritten text in the lower middle section of the page.

Handwritten text in the lower middle section of the page.

Handwritten text in the first column of the table.	Handwritten text in the second column of the table.	Handwritten text in the third column of the table.	Handwritten text in the fourth column of the table.
Handwritten text in the first column of the table.	Handwritten text in the second column of the table.	Handwritten text in the third column of the table.	Handwritten text in the fourth column of the table.

Handwritten text in the lower section of the page.

Handwritten text in the lower section of the page.

Small handwritten mark or symbol on the right side.

Handwritten text at the bottom of the page.

Small handwritten mark or symbol on the left side.

Handwritten text at the bottom left of the page.