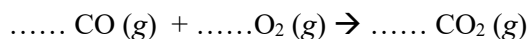


Particulate Diagrams of Chemical Reactions

1. Consider the following unbalanced equation:





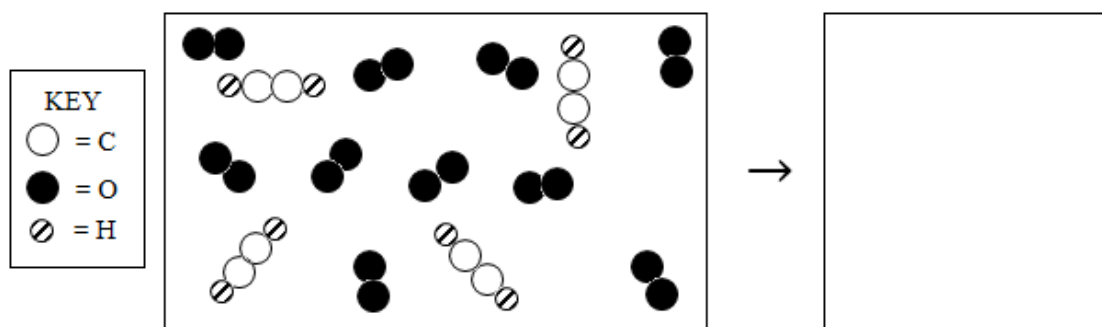
- Balance the chemical equation
- The particulate diagram represents the products of the reaction. In the other box, accurately depict the reaction mixture. Pay attention to number and types of atoms involved.



2. Consider the following unbalanced equation:

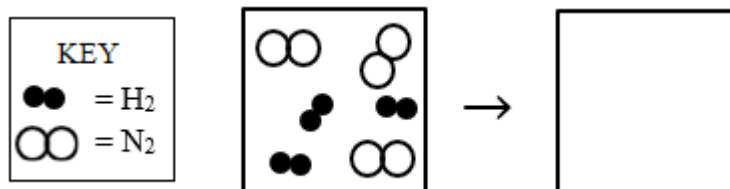


- Balance the equation
- The particulate diagram represents the reactants of the reaction. In the other box, accurately depict the products. Pay attention to number and types of atoms involved. Use  to represent water and  to represent carbon dioxide.



3. The diagram below represents hydrogen and nitrogen in a closed container. Draw the resultant mixture once the reaction runs to completion to form ammonia, NH₃.

Balanced Equation: _____

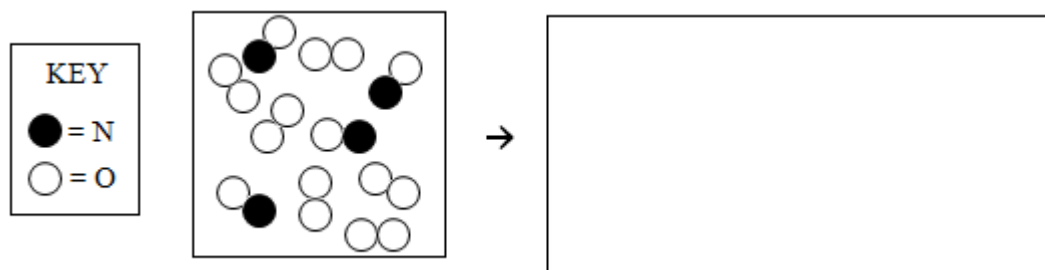


- What is the limiting reactant? What is the evidence and reasoning behind this selection?

b) How many molecules of the excess reactant are left over?

4. The diagram below represents a mixture of nitrogen monoxide (NO) and oxygen gas (O₂) in a closed container. Draw the resultant mixture once the reaction runs to completion to form NO₂ gas.

Balanced Equation: _____

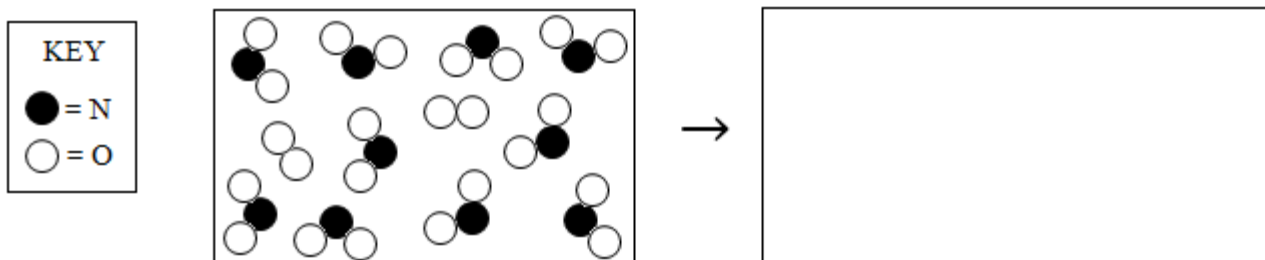


a) What is the limiting reactant? What is the evidence and reasoning behind this selection?

b) How many molecules of the excess reactant are left over?

5. The diagram below represents a mixture of nitrogen dioxide gas (NO₂) and oxygen gas (O₂) in a closed container. Draw the resultant mixture once the reaction runs to completion to form N₂O₅ gas. Express N₂O₅ as

Balanced Equation: _____

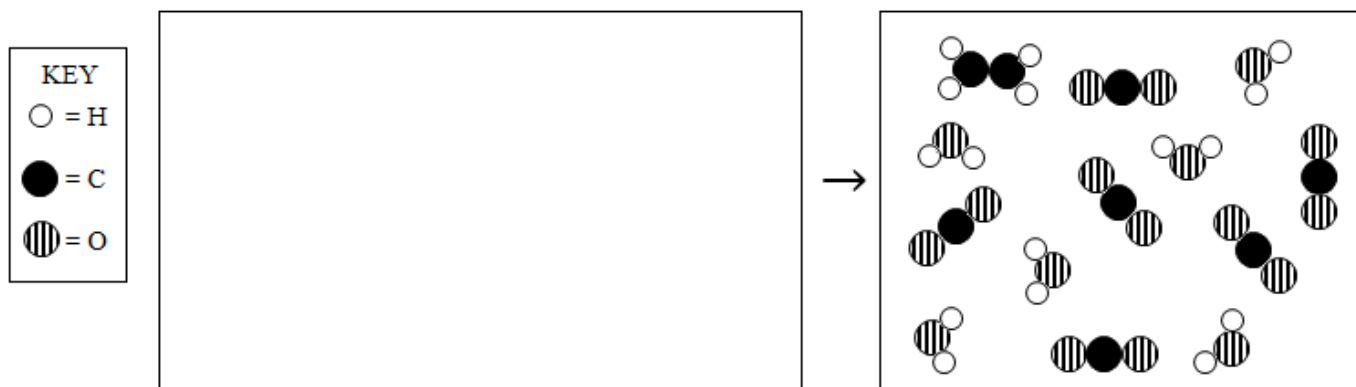


a) What is the limiting reactant? What is the evidence and reasoning behind this selection?

b) How many molecules of the excess reactant are left over?

6. The diagram below represents the resultant mixture once a sample of C_2H_4 gas is combusted with a sample of oxygen gas, O_2 . In the space provided, draw the initial reaction mixture.

Balanced Equation: _____

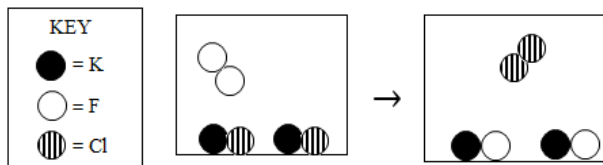


a) What is the limiting reactant? What is the evidence and reasoning behind this selection?

b) How many molecules of the excess reactant are left over?

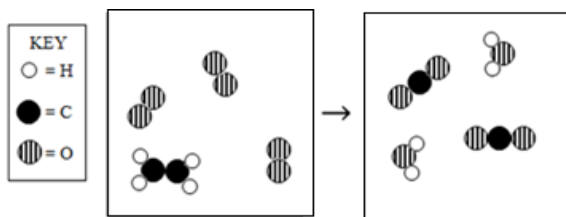
Use the following particulate diagrams of redox reactions to write a complete balanced equation.

1. _____ Chemical reaction:

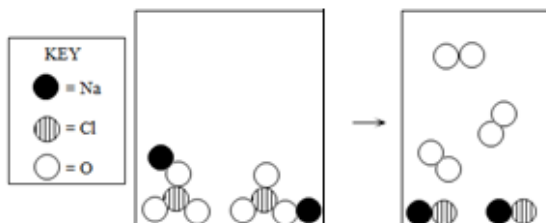


2. _____ Chemical reaction:

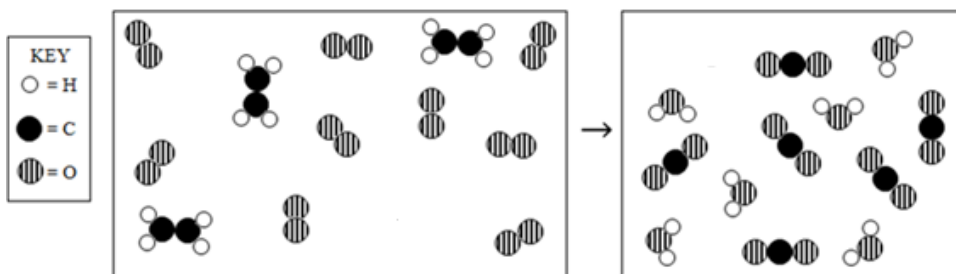
Revised from handout written by: Nomita Ramchandani (2020)



3. _____ Chemical reaction:



4. _____ Chemical reaction:

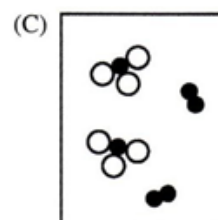
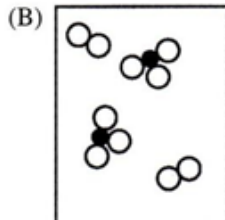
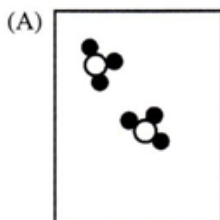


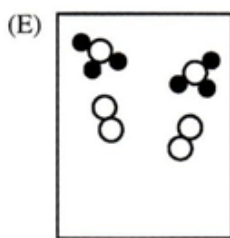
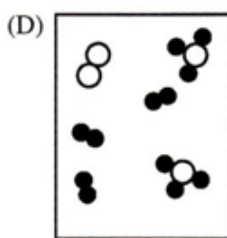
Use the information below to answer the following two questions.

The diagram below represents hydrogen and nitrogen in a closed container.



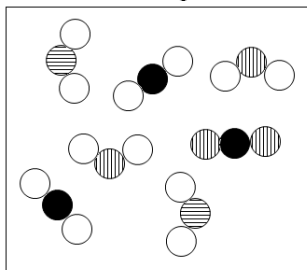
5. _____ Which of the following diagrams would represent the results if the reaction were to run to completion in the formation of ammonia, NH_3 ?





Use the information below to answer the following questions:













Volcanoes spew many chemicals when they erupt, one of which is carbon disulfide, $\text{CS}_2(g)$. The particulate diagram below represents the products once $\text{CS}_2(g)$ is combusted to produce $\text{CO}_2(g)$ and $\text{SO}_2(g)$.



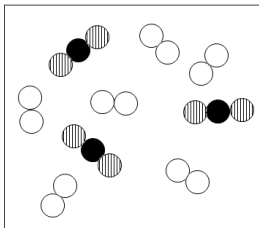
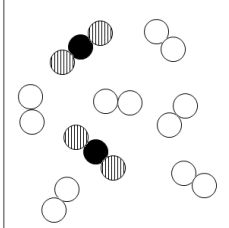
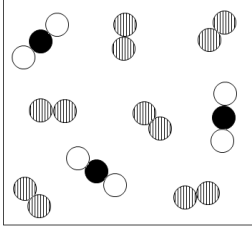
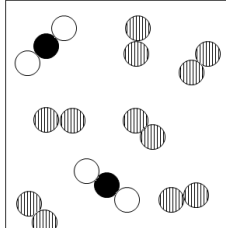
6. _____ Which of the following correctly depicts the balanced chemical reaction for the combustion of $\text{CS}_2(g)$?
- $\text{CS}_2(g) \rightarrow \text{CO}_2(g) + 2 \text{SO}_2(g)$
 - $2 \text{CS}_2(g) \rightarrow \text{CO}_2(g) + 2 \text{SO}_2(g)$
 - $\text{CS}_2(g) + 2 \text{O}_2(g) \rightarrow \text{CO}_2(g) + 2 \text{SO}_2(g)$
 - $\text{CS}_2(g) + 3 \text{O}_2(g) \rightarrow \text{CO}_2(g) + 2 \text{SO}_2(g)$

7. _____ Based on the particulate diagram, which of the following accurately describes the excess reactant with correct justification?
- $\text{CS}_2(g)$...It has the lowest coefficient in the balanced chemical equation
 - $\text{CS}_2(g)$...The diagram has CS_2 remaining once the reaction runs to completion
 - $\text{O}_2(g)$...It has the highest coefficient in the balanced chemical equation
 - $\text{O}_2(g)$...The diagram has O_2 remaining once the reaction runs to completion
 - There is not enough information to determine

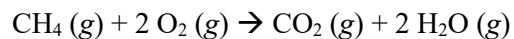
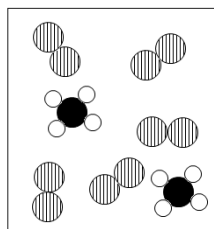
8. _____ Based on the particulate diagram, which of the following accurately depicts each element?

	 = c	 = o	 = s	 = c			
a)	 = s	b)	 = c	c)	 = o	d)	 = o
	 = o		 = s		 = c		 = s

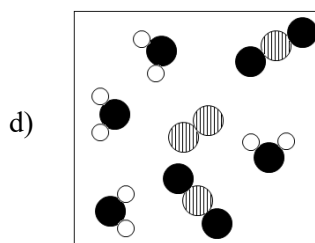
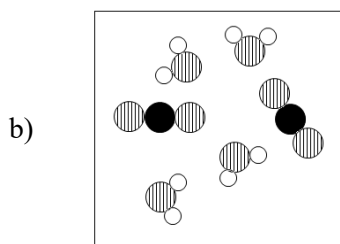
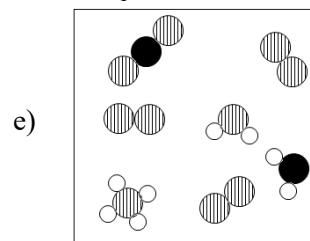
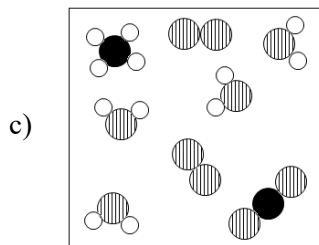
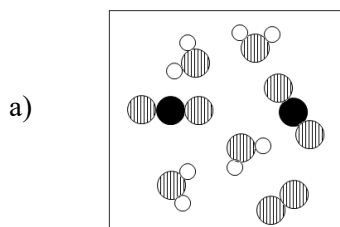
9. _____ Based on the particulate diagram, which of the following could be the reactant mixture before the combustion occurred?

a) 	b) 	c) 	d) 
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10. _____ The diagram below represents a reactant mixture. The mixture is sparked and a combustion reaction ensues.



Which of the following accurately depicts the resultant mixture once the reaction runs to completion?



11. In the space below, draw the particulate diagram illustrating the reaction between 8 molecules of SO_2 and 5 molecules of O_2 to form SO_3 . Assume the reaction proceeds until the limiting reactant is completely consumed.

	Reactants		Products
<p><u>KEY</u></p> = SO_2 = O_2 = SO_3		→	