Chapter 5
Chemical Accounting: Mass and Volume Relationships

Which of the following is not properly balanced and how would it be written correctly?

a. $P_4 + 6\ Cl_2 \rightarrow 4\ PCl_3$

b. $N_2 + O_2 \rightarrow N_2O$

c. $Ca(OH)_2 + HBr \rightarrow CaBr_2 + 2\ H_2O$

d. $C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$

Which of the following is not properly balanced and how would it be written correctly?

a. $P_4 + 6\ Cl_2 \rightarrow 4\ PCl_3$

b. $N_2 + O_2 \rightarrow N_2O$ **not balanced**

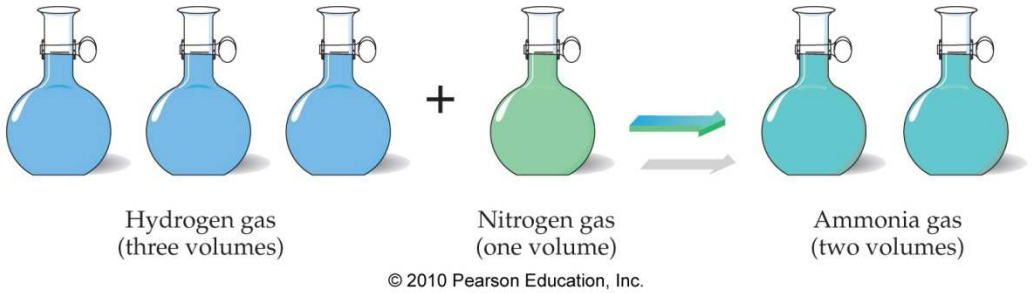
$2\ N_2 + O_2 \rightarrow 2\ N_2O$ **okay**

c. $Ca(OH)_2 + HBr \rightarrow CaBr_2 + 2\ H_2O$

d. $C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$

At a given temperature and pressure, how many liters of $NH_3(g)$ are produced according to the following:

$$3\ H_2(g) + N_2(g) \rightarrow 2\ NH_3(g)$$
$$6.0\ L \qquad 2.0\ L \qquad ?\ L$$

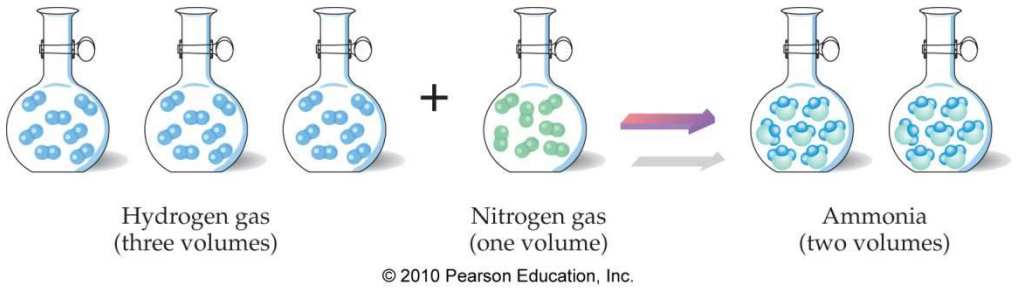


a. 0.5 L
b. 1.0 L
c. 2.0 L
d. 4.0 L
e. 6.0 L

At a given temperature and pressure, how many liters of $NH_3(g)$ are produced according to the following:

$$3\ H_2(g) + N_2(g) \rightarrow 2\ NH_3(g)$$

6.0 L 2.0 L ? L



a. 0.5 L
b. 1.0 L
c. 2.0 L
d. 4.0 L
e. 6.0 L

How many carbon atoms are in the one formula unit of $(C_3H_7NH_3)_2CO_3$?

a. 3

b. 4

c. 5

d. 6

e. 7

How many carbon atoms are in the one formula unit of $(C_3H_7NH_3)_2CO_3$?

a. 3
b. 4
c. 5
d. 6
e. 7

What is the mass in grams of 2.5 moles of ammonia, NH_3?

a. 25.0 g
b. 42.5 g
c. 46.0 g
d. 77.5 g

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d. 77.5 g

1 mole NH_3 = 17.0 g (14.0 g N + 3.0 g H)

2.5 moles NH_3 x 17.0 g/ mole NH_3 = 42.5 g

Consider the combustion of propane as represented in this chemical equation.

$$C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$$

When 7.5 moles of O_2 are consumed, how many moles of CO_2 are formed?

a. 3 moles of CO_2
b. 4 moles of CO_2
c. 4.5 moles of CO_2
d. 6 moles of CO_2

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$$C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$$

When 7.5 moles of O_2 are consumed, how many moles of CO_2 are formed?

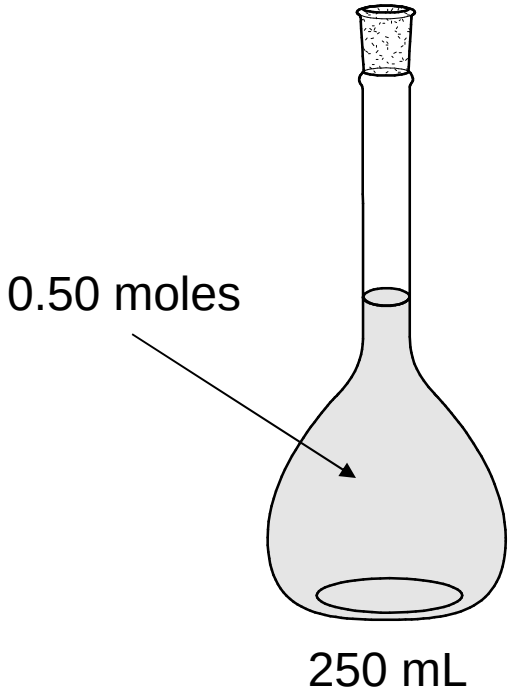
a. 3 moles of CO_2

b. 4 moles of CO_2

c. 4.5 moles of CO_2

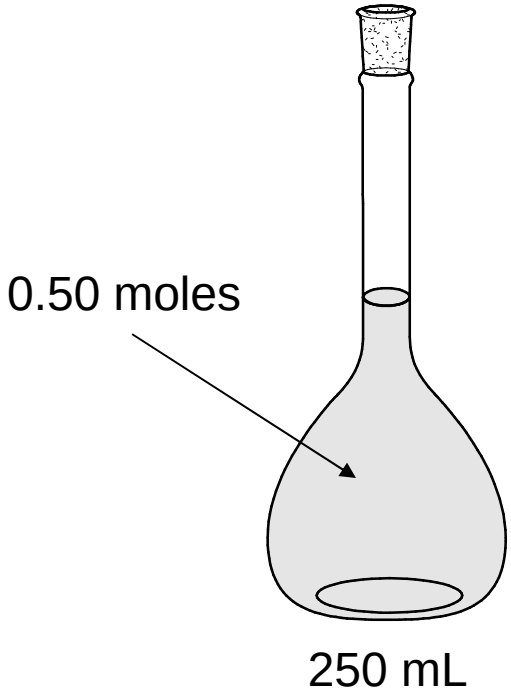
d. 6 moles of CO_2

A solution prepared by dissolving 0.50 moles of solute in 250 mL of solution would have what *molarity*?



a. 0.25 M
b. 0.5 M
c. 0.75 M
d. 1.5 M
e. 2.0 M

A solution prepared by dissolving 0.50 moles of solute in 250 mL of solution would have what *molarity*?



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b. 0.5 M
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e. 2.0 M

M = moles/L = 0.50 moles/0.250 L = 2.0 M