

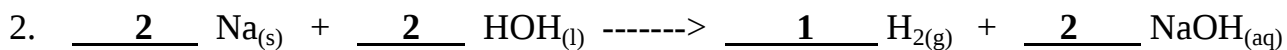
Review Exercise 8 - Answers



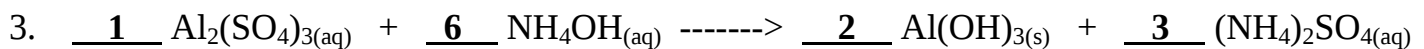
Balance the following equations and use the mole ratio from the balanced equation to complete the table which follows each equation:



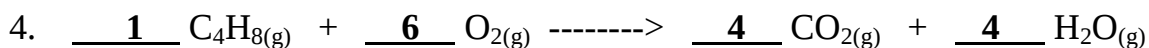
<u>2</u> $\text{H}_2\text{O}_{(l)}$	----->	<u>2</u> $\text{H}_{2(g)}$	+	<u>1</u> $\text{O}_{2(g)}$
5.00 mol		5.00 mol		2.50 mol
1.20 mol		1.20 mol		0.600 mol
3.00 mol		3.00 mol		1.50 mol



<u>2</u> $\text{Na}_{(s)}$	+	<u>2</u> $\text{HOH}_{(l)}$	----->	<u>1</u> $\text{H}_{2(g)}$	+	<u>2</u> $\text{NaOH}_{(aq)}$
8.0 mol		8.0 mol		4.0 mol		8.0 mol
0.20 mol		0.20 mol		0.10 mol		0.20 mol
9.60 mol		9.60 mol		4.80 mol		9.60 mol
16.0 mol		16.0 mol		8.00 mol		16.0 mol



<u>1</u> $\text{Al}_2(\text{SO}_4)_{3(aq)}$	+	<u>6</u> $\text{NH}_4\text{OH}_{(aq)}$	----->	<u>2</u> $\text{Al}(\text{OH})_{3(s)}$	+	<u>3</u> $(\text{NH}_4)_2\text{SO}_{4(aq)}$
3.00 mol		18.0 mol		6.00 mol		9.00 mol
0.333 mol		2.00 mol		0.667 mol		1.00 mol
0.500 mol		3.00 mol		1.00 mol		1.50 mol
0.333 mol		2.00 mol		0.667 mol		1.00 mol

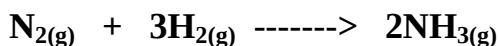


<u>1</u> $\text{C}_4\text{H}_{8(g)}$	+	<u>6</u> $\text{O}_{2(g)}$	----->	<u>4</u> $\text{CO}_{2(g)}$	+	<u>4</u> $\text{H}_2\text{O}_{(g)}$
0.053 mol		0.318 mol		0.212 mol		0.212 mol
0.0300 mol		0.180 mol		0.120 mol		0.120 mol
0.0833 mol		0.500 mol		0.333 mol		0.333 mol
0.320 mol		1.92 mol		1.28 mol		1.28 mol



$\underline{1} \text{ P}_{4(s)}$	+	$\underline{6} \text{ I}_{2(s)}$	$\text{ -----} >$	$\underline{4} \text{ PI}_{3(s)}$
0.705 mol		4.23 mol		2.82 mol
0.0660 mol		0.396 mol		0.264 mol
2.50 mol		15.0 mol		10.0 mol

6. Use the following equation to answer the questions below.



a) How many moles of hydrogen will react with 5.0 moles of nitrogen?

$$5.0 \cancel{\text{mol N}_{2(g)}} \times \frac{3 \text{ mol H}_{2(g)}}{1 \cancel{\text{mol N}_{2(g)}}} = 15 \text{ mol H}_{2(g)}$$

b) How many moles of hydrogen and nitrogen will react to produce 20 moles of ammonia?

The mole ratio is 1 mol N_{2(g)} : 3 mol H_{2(g)} : 2 mol NH_{3(g)}

20 moles of NH_{3(g)} is 10 times the 2 mol of NH_{3(g)} in the equation.

Therefore 10 moles of N_{2(g)} and 30 mol of H_{2(g)} will be required to produce 20 moles of NH_{3(g)}

c) If 4.0 moles of hydrogen are used, how many moles of nitrogen are needed?

$$4.0 \cancel{\text{mol H}_{2(g)}} \times \frac{1 \text{ mol N}_{2(g)}}{3 \cancel{\text{mol H}_{2(g)}}} = 1.3 \text{ mol N}_{2(g)}$$

d) If 3.6 moles of nitrogen are used, how many moles of ammonia are produced?

$$3.6 \cancel{\text{mol N}_{2(g)}} \times \frac{2 \text{ mol NH}_{3(g)}}{1 \cancel{\text{mol N}_{2(g)}}} = 7.2 \text{ mol NH}_{3(g)}$$

e) If 0.673 moles of ammonia are produced, how many moles of hydrogen are needed?

$$0.673 \cancel{\text{mol NH}_{3(g)}} \times \frac{3 \text{ mol H}_{2(g)}}{2 \cancel{\text{mol NH}_{3(g)}}} = 1.01 \text{ mol H}_{2(g)}$$

f) If 2.3 moles of ammonia are produced, how many moles of nitrogen are needed?

$$2.3 \cancel{\text{mol NH}_{3(g)}} \times \frac{1 \text{ mol N}_{2(g)}}{2 \cancel{\text{mol NH}_{3(g)}}} = 1.2 \text{ mol N}_{2(g)}$$