

Answer Key:

Question 1) Answer: 2:2

Steps:

When looking at the balanced equation the number in front of SnPO_4 is 2 and the number in front of Sn balancing the equation is also 2 therefore it is a 2:2 ratio.

Question 2) Answer: 9.0 moles MgC_2O_4

Steps:

$\frac{6.0 \text{ moles H}_3\text{AsO}_4 \times 3 \text{ moles MgC}_2\text{O}_4}{2 \text{ moles H}_3\text{AsO}_4}$ Multiply across the top rows, divide by the bottom rows, crossing out units as you go along for all the following problems.

Question 3) Answer: 5.00 moles Br_2

Steps:

$\frac{10.0 \text{ mole KBr} \times 1 \text{ mole Br}_2}{2 \text{ moles KBr}}$

Question 4) Answer: 412 grams Sn

Steps:

$\frac{8.0 \text{ g H}_2 \times 1 \text{ mole H}_2 \times 2 \text{ mole Sn} \times 118.71 \text{ g Sn}}{2.0158 \text{ g H}_2 \quad 3 \text{ mole H}_2 \quad 1 \text{ mole Sn}}$

Question 5) Answer: 898.3 grams MgC_2O_4

Steps:

$\frac{720.0 \text{ g H}_2\text{C}_2\text{O}_4 \times 1 \text{ mole H}_2\text{C}_2\text{O}_4 \times 3 \text{ mole MgC}_2\text{O}_4 \times 112.33 \text{ g MgC}_2\text{O}_4}{90.0358 \text{ g H}_2\text{C}_2\text{O}_4 \quad 3 \text{ mole H}_2\text{C}_2\text{O}_4 \quad 1 \text{ mole MgC}_2\text{O}_4}$

Question 6) Answer: 6.7x10⁴ grams KBr

Steps:

$$\frac{450.0\text{kg Br}_2 \times 1000\text{g Br}_2 \times 1 \text{ mole Br}_2 \times 2 \text{ mole KBr} \times 119\text{g KBr}}{1 \text{ kg Br}_2 \quad 159.8\text{g Br}_2 \quad 1 \text{ mole Br}_2 \quad 1 \text{ mole KBr}}$$

Question 7) Answer: 42.2 moles H₂

Steps:

$$\frac{85.0 \text{ g H}_2 \times 1 \text{ mole H}_2}{2.0158\text{g H}_2}$$

Question 8) Answer: 0.47 moles H₃PO₄

Steps:

$$\frac{46. \text{ g H}_3\text{PO}_4 \times 1 \text{ mole H}_3\text{PO}_4}{97.9937\text{g H}_3\text{PO}_4}$$

Question 9) Answer: 850 grams SnPO₄

Steps:

$$\frac{4.0 \text{ mole SnPO}_4 \times 213.68\text{g SnPO}_4}{1 \text{ mole SnPO}_4}$$

Question 10) Answer: 3.16x10²⁵ molecules NaOH

Steps:

$$\frac{60.0 \text{ mole NaOH} \times 6.02 \times 10^{23} \text{ molecule NaOH}}{1 \text{ mole NaOH}}$$

Question 11) Answer: 9.63x10²² molecules H₂SO₄

Steps:

$$\frac{160.\text{millimol H}_2\text{SO}_4 \times 0.001 \text{ mol H}_2\text{SO}_4 \times 6.02 \times 10^{23} \text{ molecule H}_2\text{SO}_4}{1 \text{ millimol H}_2\text{SO}_4 \quad 1 \text{ mole H}_2\text{SO}_4}$$

Question 12) Answer: 4.75×10^{23} molecules of PO_4

Steps:

$$\underline{75.0\text{g PO}_4 \times 1 \text{ mole PO}_4 \times 6.02 \times 10^{23} \text{ molecule PO}_4}$$

$$94.97\text{g PO}_4 \quad 1 \text{ mole PO}_4$$

Question 13) Answer: 1.2×10^{27} molecules NaCl

Steps:

$$\underline{120\text{kg NaCl} \times 1000\text{g NaCl} \times 1 \text{ mole NaCl} \times 6.02 \times 10^{23} \text{ molecule NaCl}}$$

$$1\text{kg NaCl} \quad 58.44\text{g NaCl} \quad 1 \text{ mole NaCl}$$

Question 14) Answer: 2.2×10^{22} atoms of Sn

Steps:

$$\underline{7.7\text{g SnPO}_4 \times 1 \text{ mole SnPO}_4 \times 6.02 \times 10^{23} \text{ molecule SnPO}_4 \times 1 \text{ atom Sn}}$$

$$213.68\text{g SnPO}_4 \quad 1 \text{ mol SnPO}_4 \quad 1 \text{ molecule Sn}$$

Question 15) Answer: 1.3×10^{23} grams of NaOH

Steps:

$$\underline{8.5 \text{ atoms NaOH} \times 6.02 \times 10^{23} \text{ molecule NaOH} \times 1 \text{ mol NaOH}}$$

$$1 \text{ molecule NaOH} \quad 1 \text{ mole NaOH} \quad 39.9979\text{g NaOH}$$

Question 16) Answer: 1.2×10^{25} atoms O

Steps:

$$\underline{6.7 \text{ moles Fe(OH)}_3 \times 6.02 \times 10^{23} \text{ molecules Fe(OH)}_3 \times 3 \text{ atoms O}}$$

$$1 \text{ mole Fe(OH)}_3 \quad 1 \text{ molecule Fe(OH)}_3$$

Question 17) Answer: 4.83×10^{28} atoms of O

Steps:

$$\underline{8.02 \times 10^4 \text{ moles H}_2\text{O} \times 6.02 \times 10^{23} \text{ molecules H}_2\text{O} \times 1 \text{ atom O}}$$

$$1 \text{ mol H}_2\text{O} \quad 1 \text{ molecule H}_2\text{O}$$