

Sig Figures / Mole Review WS

Name: Key

1. Give the number of significant digits in each of the following. Assume they are all measurements.

- a) 0.004800 4 d) 3.20000×10^{-4} 6
b) 4200 00 2 e) 300 040.00 8
c) 1.0075×10^5 5 f) 3789 4

2. Perform the following calculations and round the answers off to the correct number of significant digits as justified by the data. Assume all numbers are measurements.

- a) 2.15×0.0054 0.012 d) $6.97 \times 10^5 \div 4.300 \times 10^{-7}$ 1.62×10^{12}
b) $0.02 + 345.761$ 345.78 e) $89.027 - 1.33$ 87.70
c) $(6.42 \times 8.52) + 19.973$ 74.07 f) 0.0020×178.943 0.36
54.6984
74.6714

3. Round the following numbers to 2 significant digits.

- a) 2 000 000 2.0×10^6 c) 3.6845×10^{28} 3.7×10^{28}
b) 30 700 3.1×10^4 d) 0.000 000 4595 4.6×10^{-7}

4. Make the following conversions, clearly showing your steps. Include proper units in all of your work and in your answer.

a. 127.5 grams of PCl_3 = ? moles

$$\begin{array}{l} \text{mm PCl}_3 \\ 1 \times 31 = 31 \\ 3 \times 35.5 = 106.5 \\ \hline 137.5 \end{array}$$

$$127.5 \text{ g PCl}_3 \times \frac{1 \text{ mol PCl}_3}{137.5 \text{ g PCl}_3} = 0.9273 \text{ moles PCl}_3$$

Answer 0.9273 moles PCl_3

b. 0.00356 moles of $\text{SrCrO}_4 = ?$ grams

$$\begin{array}{r} \text{mm SrCrO}_4 \\ 87.6 \quad 87.6 \\ 52.0 \quad 52 \\ 4 \times 16.0 = 64 \\ \hline 203.6 \end{array}$$

$$0.00356 \text{ moles SrCrO}_4 \times \frac{203.6 \text{ g SrCrO}_4}{1 \text{ mol SrCrO}_4} =$$

Answer 0.725 moles SrCrO_4

c. 85.288 L of NO_2 at STP = ? moles

$$85.288 \text{ L NO}_2 \times \frac{1 \text{ mol}}{22.4 \text{ L}} = 3.8075$$

Answer 3.8075 mole NO_2

d. 803.895 g of PCl_5 gas = ? L (STP)

$$\begin{array}{r} \text{mm PCl}_5 \\ 31.0 = 31.0 \\ 5 \times 35.5 = 177.5 \\ \hline 208.5 \end{array}$$

$$803.895 \text{ g PCl}_5 \times \frac{1 \text{ mol PCl}_5}{208.5 \text{ g PCl}_5} \times \frac{22.4 \text{ L}}{1 \text{ mol}} =$$

Answer 86.3657 L PCl_5

e. 3452 mL of CH_4 gas at STP = ? g

$$\begin{array}{r} \text{mm CH}_4 \\ 12 \\ 4 \\ \hline 16 \end{array} \quad 3452 \text{ mL CH}_4 \times \frac{1 \text{ mol}}{22.4 \text{ L}} \times \frac{16 \text{ g CH}_4}{1 \text{ mol CH}_4} = 2.4657 \text{ g}$$

$$3452 \text{ mL} \times \frac{10^{-3} \text{ L}}{1 \text{ mL}}$$

Answer 2.466 g CH_4

f. 1.25 kg of nitrogen gas = ? L (STP)

$$\begin{array}{r} \text{mm N}_2 \\ 28.0 \end{array} \quad 1.25 \text{ kg N}_2 \times \frac{10^3 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ mol}}{28.0 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ molecules N}_2}{1 \text{ mol}} \times \frac{2 \text{ N atoms}}{1 \text{ molecule N}_2}$$

Answer 5.38×10^{25} "N" atoms