

## Math Review & Problem-Solving 6

# Key

### SIGNIFICANT DIGITS:

Carry out the following calculations and report to the correct number of significant digits. (Include units)

1)  $80 \text{ cm} + 13.0 \text{ cm} = 90 \text{ cm}$

5)  $0.7600 \text{ mm}^3 / 0.0152 \text{ mm} = 50.0 \text{ mm}^2$

2)  $3.4 \times 10^{-9} \text{ m} + 1.27 \times 10^{-7} \text{ m} = 1.30 \times 10^{-7} \text{ m}$

6)  $3 \text{ cm} \times 6 \text{ cm} = 20 \text{ cm}^2$

3)  $750. \text{ g} + 677.4 \text{ g} = 1427 \text{ g}$

7)  $(8.6 \text{ g} + 7.8 \text{ g}) / 23.51 \text{ cm}^3 = 0.698 \text{ g/cm}^3$

4)  $1100 \text{ cm} + 8 \text{ cm} = 1100 \text{ cm}$

8)  $6.000 \times 10^{-3} \text{ m} \times 0.0020 \text{ m} = 1.2 \times 10^{-5} \text{ m}^2$

### DIMENSIONAL ANALYSIS:

Carry out the following conversions and report to the correct number of significant digits.

9) Convert  $8.6 \mu\text{g}$  to  $\text{dg}$

$$\frac{8.6 \mu\text{g}}{1 \mu\text{g}} \times \frac{1 \times 10^{-6} \text{ g}}{1 \text{ g}} \times \frac{1 \text{ dg}}{1 \times 10^{-1} \text{ g}} = 8.6 \times 10^{-5} \text{ dg}$$

10) Convert  $9.86 \times 10^8 \text{ dm}^2$  to  $\text{km}^2$

$$\frac{9.86 \times 10^8 \text{ dm}^2}{100 \text{ dm}^2} \times \frac{1 \text{ m}^2}{1000000 \text{ m}^2} \times \frac{1 \text{ km}^2}{1000000 \text{ m}^2} = 9.86 \text{ km}^2$$

11) Convert  $13.6 \text{ g/mL}$  to  $\text{lb/ft}^3$

$$\frac{13.6 \text{ g}}{1 \text{ mL}} \times \frac{1 \text{ mL}}{1 \text{ cm}^3} \times \frac{(2.54)^3 \text{ cm}^3}{1 \text{ in}^3} \times \frac{(12)^3 \text{ in}^3}{1 \text{ ft}^3} \times \frac{1 \text{ oz}}{28.35 \text{ g}} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 849 \text{ lb/ft}^3$$

12) Convert  $15.22 \text{ g Ba(NO}_3)_2$  to formula units.

$$\frac{15.22 \text{ g Ba(NO}_3)_2}{261.32 \text{ g}} \times \frac{1 \text{ mol}}{1 \text{ mol}} \times \frac{6.022 \times 10^{23} \text{ formula units}}{1 \text{ mol}} = 3.51 \times 10^{22}$$

13) What mass is equal to  $63.2 \text{ mmol}$  (millimole) of benzoic acid,  $\text{C}_7\text{H}_6\text{O}_2$ ?

$$\frac{63.2 \text{ mmol}}{1000 \text{ mmol}} \times \frac{122.12 \text{ g}}{1 \text{ mol}} = \boxed{7.72 \text{ g}}$$

$$= 3.51 \times 10^{22} \text{ formula units Ba(NO}_3)_2$$

### SCIENTIFIC NOTATION

Express the following numbers in scientific notation with the proper number of significant digits:

14)  $0.0000552 \times 10^3$

$$5.52 \times 10^{-2}$$

15)  $35.882 \times 10^{-6}$

$$3.5882 \times 10^{-5}$$

Express the following numbers in long form with the proper number of significant digits:

16)  $3.000 \times 10^3$

$$3000. \quad \text{or} \quad 3000\bar{0}$$

17)  $1.20 \times 10^{-2}$

$$0.0120$$

18)  $5.00 \times 10^5$

$$500\bar{0}000$$

19) If 5.25 g of silver is added to a graduated cylinder containing 11.2 mL of water, to what level will the water level rise?

$$\boxed{11.7 \text{ mL}}$$

$$\frac{5.25 \text{ g Ag} \quad | \quad 1 \text{ mL}}{10.49 \text{ g}} = 0.500 \text{ mL}$$

$$\begin{array}{r} 11.2 \text{ mL} \\ + 0.500 \text{ mL} \\ \hline 11.7 \text{ mL} \end{array}$$