

State the number of significant figures represented in each of the following numbers :

- |             |          |
|-------------|----------|
| 1) 1.0040   | <u>5</u> |
| 2) 0.00031  | <u>2</u> |
| 3) 1378.9   | <u>5</u> |
| 4) 100      | <u>1</u> |
| 5) 10000.00 | <u>7</u> |

Calculate the following, **round the final answer to the correct number of significant figures:**

6) 
$$\begin{array}{r} 5.302 \\ 3.80 \\ +79.324 \\ \hline \end{array}$$

88.426

6) 88.43

7)  $4.657 \times 98.003 \times 5.87 =$

2679.06783

7) 2680

8)  $(1.3 \times 10^2)(6.40 \times 10^{-1}) =$

83.2

8) 83

9)  $8.30 \div 0.045 =$

184.4444

9) 180

Convert the following (2 points each), be sure to SHOW YOUR WORK:

10) 25°C to °F

$$\underline{77^{\circ}\text{F}} \quad (1.8 \times 25) + 32$$

11) -60 °F to K

$$\underline{221 \text{ K}} \quad \begin{aligned} &(-60 - 32) \div 1.8 = -51.11 \\ &-51.11 + 273 \end{aligned}$$

12) 55 °C to K

$$\underline{328 \text{ K}} \quad 55 + 273$$

13) 345 K to °C

$$\underline{72^{\circ}\text{C}} \quad 345 - 273$$

14) 265°F to °C

$$\underline{129^{\circ}\text{C}} \quad (265 - 32) \div 1.8$$

15) 265 K to °F

$$\underline{17.6^{\circ}\text{F}} \quad \begin{aligned} &265 - 273 = -8 \\ &(1.8 \times -8) + 32 \end{aligned}$$

**Equivalence Statements**

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) / 1.8$$

$$\text{K} = ^{\circ}\text{C} + 273$$

$$^{\circ}\text{C} = \text{K} - 273$$

The following questions are about density.

- 16) If I have a sample that has a volume of  $33.5 \text{ cm}^3$  and weighs 23.5 grams. What is the density of the object?

$$\frac{23.5 \text{ g}}{33.5 \text{ cm}^3} = 0.701 \text{ g/cm}^3$$

- 17) My sample has a known density of  $5.00 \text{ grams/ml}$  and I have a 15 gram sample. How much space will this sample occupy?

$$5.00 \text{ g/cm}^3 = \frac{15 \text{ g}}{X \text{ cm}^3} = 3.0 \text{ cm}^3 \text{ or mL}$$
$$\frac{15 \text{ g}}{5.00 \text{ g/cm}^3}$$

- 18) I have a 25 ml sample of a substance with a known density of  $14.1 \text{ g/cm}^3$ . What is the mass of my sample?

$$14.1 \text{ g/cm}^3 = \frac{X \text{ g}}{25 \text{ mL}}$$
$$14.1 \text{ g/cm}^3 \times 25 \text{ mL} = 352.5 \text{ g}$$
$$350 \text{ g (sig fig)}$$

- 19) A block has the dimensions of 3.0 cm by 5.0 cm by 2.0 cm. What is the density of the block if it weighs 45 grams? (hint: Volume =  $L \times W \times H$ )

$$3 \times 5 \times 2 = 30 \text{ cm}^3$$
$$\frac{45 \text{ g}}{30 \text{ cm}^3} = 1.5 \text{ g/cm}^3$$

- 20) An irregular object is placed in 25 ml of water. The new reading on the flask is 45 ml. The recorded mass of the object is 13 grams. What is the density of the object?

$$45 - 25 = 20 \text{ mL}$$
$$\frac{13 \text{ g}}{20 \text{ mL}} = 0.65 \text{ g/mL}$$