

54 pts

## Common Conversions in Chemistry

c1. Convert 50.0 cm<sup>3</sup> into milliliters.

$$50.0 \text{ cm}^3 \times \frac{1 \text{ mL}}{1 \text{ cm}^3} = 50.0 \text{ mL}$$

c2. Convert 5.00 liters into milliliters.

$$5.00 \text{ L} \times \frac{1000 \text{ mL}}{1 \text{ L}} = 5.00 \times 10^3 \text{ mL}$$

c3. Convert 3500 cm<sup>3</sup> into mL, then liters.

$$3500 \text{ cm}^3 \times \frac{1 \text{ mL}}{1 \text{ cm}^3} = 3500 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} = 3.5 \text{ L}$$

c4. Convert 37.0 °C into Kelvin.

$$37.0^\circ\text{C} + 273.15 = 310.2 \text{ K}$$

c5. Convert 1.05 atmospheres (atm) into mm Hg.

$$1.05 \text{ atm} \times \frac{760 \text{ mmHg}}{1 \text{ atm}} = 798 \text{ mmHg}$$

c6. Convert 78 cm into meters.

$$78 \text{ cm} \times \frac{1 \text{ m}}{100 \text{ cm}} = 0.78 \text{ m}$$

c7. Convert 420 nm into meters.

$$420 \text{ nm} \times \frac{1 \text{ m}}{1 \times 10^9 \text{ nm}} = 4.2 \times 10^{-7} \text{ m}$$

c8. Convert 454.0 g into kilograms.

$$454.0 \text{ g} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 0.4540 \text{ kg}$$

c9. Convert 454 kg into grams.

$$454 \text{ kg} \times \frac{1000 \text{ g}}{1 \text{ kg}} = 4.54 \times 10^5 \text{ g}$$

c10. Convert 0.0023 moles into particles.

$$0.0023 \text{ mol} \times \frac{6.02 \times 10^{23} \text{ part}}{1 \text{ mol}} = 1.4 \times 10^{21} \text{ part}$$

c11. Convert 12 in into centimeters.

$$12 \text{ in} \times \frac{2.54 \text{ cm}}{1 \text{ in}} = 30.5 \text{ cm}$$

c12. Convert 50. lbs into grams.

$$50. \text{ lbs} \times \frac{454 \text{ g}}{1 \text{ lb}} = 2.3 \times 10^4 \text{ g}$$

c13. Convert 103 kilopascals (kPa) into atm.

$$103 \text{ kPa} \times \frac{1 \text{ atm}}{101.3 \text{ kPa}} = 1.02 \text{ atm}$$

c14. Convert  $3.75 \times 10^{22}$  particles into moles.

$$3.75 \times 10^{22} \text{ part} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ part}} = .0623 \text{ mol}$$

b15. Convert 1800 kilocalories into calories, then into joules (J)

$$1800 \text{ kcal} \times \frac{1000 \text{ cal}}{1 \text{ kcal}} = 1.8 \times 10^6 \text{ cal} \times \frac{4.184 \text{ J}}{1 \text{ cal}} = 7.5 \times 10^6 \text{ J}$$

b16. Convert  $3.0 \text{ ft}^3$  into cubic inches.

$$3.0 \text{ ft}^3 \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{12 \text{ in}}{1 \text{ ft}} = 5200 \text{ in}^3$$

b17. Convert  $4.5 \times 10^6 \text{ cm}^3$  into cubic meters.

$$4.5 \times 10^6 \text{ cm}^3 \times \left( \frac{1 \text{ m}}{100 \text{ cm}} \right)^3 = 4.5 \text{ m}^3$$

b18. Convert  $3.5 \text{ km}^2$  into square meters.

$$3.5 \text{ km}^2 \times \left( \frac{1000 \text{ m}}{1 \text{ km}} \right)^2 = 3.5 \times 10^6 \text{ m}^2$$

Answers to problems:

1. 50.0 ml    2.  $5.00 \times 10^3$  mL    3. 3500 ml, 3.5 L    4. 310.2 K    5. 798 mm Hg

6. 0.78 m    7.  $4.2 \times 10^{-7}$  m    8. 0.4540 kg    9.  $4.54 \times 10^5$  g    10.  $1.4 \times 10^{21}$  part

11. 30. cm    12.  $2.3 \times 10^4$  g    13. 1.02 atm    14. 0.0623 moles

15.  $1.8 \times 10^6$  cal,  $7.5 \times 10^6$  J    16. 5200 in<sup>3</sup>    17. 4.5 m<sup>3</sup>    18.  $3.5 \times 10^6$  m<sup>2</sup>

Very common metric conversions (these also work for: grams and liters)

$$1 \text{ m} = 100 \text{ cm} = 1000 \text{ mm}$$

$$1 \text{ km} = 1000 \text{ m}$$

### Common Conversions

$$1 \text{ atm} = 760 \text{ mm Hg} = 101.3 \text{ kPa} = 14.7 \text{ psi}$$

$$1 \text{ mole} = 6.02 \times 10^{23} \text{ particles}$$

$$1 \text{ calories} = 4.184 \text{ joules}$$

$$1 \text{ lb} = 454 \text{ grams}$$

$$1 \text{ in} = 2.54 \text{ cm}$$

$$1 \text{ m} = 1 \times 10^9 \text{ nm}$$

$$\text{---}^\circ\text{C} + 273.15 = \text{---} \text{K}$$

$$1 \text{ mL} = 1 \text{ cm}^3$$