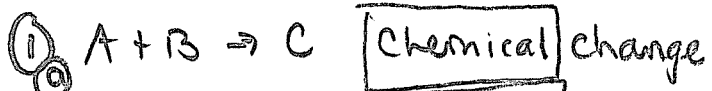


Ch. 1 # 1, 5, 27, 31, 37, 44, 46, 55, 57, 59, 67, 73, 75, 77, 82, 84



(d) same chemical properties  
went from g  $\rightarrow$  solid

(5) physical change - state of substance is changed but not  
Chemical composition

Chemical change - one or more substances is converted  
into one or more new substances with different  
composition and properties



(27)  $2.22 \times 10^{-10} m \rightarrow \text{\AA}$        $1 \text{\AA} = 10^{-10} m$

$$2.22 \times 10^{-10} m \times \frac{1 \text{\AA}}{10^{-10} m} = \boxed{2.22 \text{\AA}}$$

(31) (a)  $7903 \text{ mm}^2 \rightarrow \text{ft}^2$

$$7903 \text{ mm}^2 \times \left(\frac{1 \text{ cm}}{10 \text{ mm}}\right)^2 \times \left(\frac{1 \text{ m}}{100 \text{ cm}}\right)^2 \times \left(\frac{39.37 \text{ in}}{1 \text{ m}}\right)^2 \times \left(\frac{1 \text{ ft}}{12 \text{ in}}\right)^2 = \boxed{\begin{matrix} 0.08511 \text{ ft}^2 \\ 8.51 \times 10^{-2} \text{ ft}^2 \end{matrix}}$$

(b)  $7903 \text{ mm}^2 \times \frac{45 \text{ s}}{135 \text{ mm}^2} = \boxed{2.634 \times 10^3 \text{ s}}$

(37) (a)  $1 \text{ qt} = 946.4 \text{ mL} = ? \text{ m}^3$

$$946.4 \text{ cm}^3 \times \left(\frac{1 \text{ m}}{100 \text{ cm}}\right)^3 = \boxed{9.46 \times 10^{-4} \text{ m}^3}$$

(b)  $835 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{1000 \text{ cm}^3}{1.057 \text{ qt}} \times \frac{1 \text{ L}}{1000 \text{ cm}^3} =$

$$\boxed{3.16 \times 10^3 \text{ L}}$$

44)  $m = 25\text{g}$  added to  $25\text{mL H}_2\text{O}$

$$\text{Zn} = 7.14\text{g/mL}$$

$$\text{Fe} = 7.87\text{g/mL}$$

$$\text{Ni} = 8.91\text{g/mL}$$

a)  $V = 28.1 - 25 = 3.1\text{ mL}$

$$D = 25\text{g} / 3.1 = 8.06\text{g/mL}$$

Fe

b)  $V = 27.7 - 25 = 2.7\text{ mL}$

$$D = 25\text{g} / 2.7 = 9.25\text{g/mL}$$

Ni

c)  $V = 28.5 - 25 = 3.5$

$$D = 25\text{g} / 3.5 = 7.14\text{g/mL}$$

Zn

46) a) more dense than water = A  
less dense than water = B + C

b)  $W_{\text{den}} = 1.0\text{g/mL}$

$$C_{\text{den}} = 0.88\text{g/mL}$$

$$A_{\text{den}} = 1.4\text{g/mL}$$

$B_{\text{den}} =$  \* must be less than water  
but greater than C

$$= 0.94\text{g/mL}$$

55) a)  $231.554 \rightarrow 231.6$

b)  $0.00845 \rightarrow 0.0084$

c)  $144000 \rightarrow 140000$   
or  $1.4 \times 10^5$

5 followed by nonzeros so  
preceding #  $\uparrow$  by 1

5 not followed by any #'s so  
preceding # is even so it stays  
the same

(57) round to 1 few & calculator

$$\frac{11 * 6.2 * 2.38}{24 * 2 * 20} = 0.16907... \rightarrow 0.2$$

↑  
controls  
# sig figs

(59) (a)  $\frac{24.20 + 15.6}{4.8} = \boxed{3.8}$

↑  
controls  
Sig fig

(b)  $\frac{7.87}{16.1 - 8.44} = 1.0274 \rightarrow 1.0$

↑  
7.66  
7.6

subtraction carries only 1 place past decimal resulting in 2 sig fig

(c)  $V = \pi r^2 h$   $r = 6.23 \text{ cm}$   
 $h = 4.630 \text{ cm}$

$$V = 3.14 (6.23)^2 (4.630) = 564.555 \text{ cm}^3$$

↓ 3 sig figs      ↓ 565 cm<sup>3</sup>

(67) (a)  $\frac{4.32 \times 10^7 \text{ g}}{\frac{4}{3} (3.1416) (1.95 \times 10^2 \text{ cm})^3} = 1.39 \text{ g/cm}^3$

(b)  $\frac{(1.84 \times 10^3 \text{ g})(44.7 \text{ m/s})^2}{2} = 1.84 \times 10^5 \text{ g m}^2/\text{s}^2$

(c)  $\frac{(1.07 \times 10^{-4} \text{ mol/L})^2 (3.8 \times 10^{-3} \text{ mol/L})}{(8.35 \times 10^{-5} \text{ mol/L})(1.48 \times 10^{-2} \text{ mol/L})^3} = 0.16 \text{ mol}^{-1} \text{ L}$

73

- (a) same average result = II / IV
- (b) high precision = III / IV all shots close together
- (c) high accuracy = IV (maybe II)
- (d) systematic error = III   
 \* problem w/ instrument   
 \* not calibrated

75

(a) How many chemical changes

yellow + red → yellow red  
 red + blue → red blue

(2)

(b) physical changes

blue (solid) → b (gas) (1)  
 or (liquid)

77 50.0 m x 25.0 m

(a) How many gallons H<sub>2</sub>O w/ d = 1.0 g/mL needed for 4.8 ft deep?

$$4.8 \text{ ft} \times \frac{0.3048 \text{ m}}{1 \text{ ft}} = 1.463 \text{ m deep}$$

$$\text{total volume} = 50.0(25.0)(1.463) = 1828.75 \text{ m}^3$$

$$1828.75 \text{ m}^3 \times \frac{1 \text{ dm}^3}{10^{-3} \text{ m}^3} \times \frac{1 \text{ gal}}{3.785 \text{ dm}^3} =$$

4.8 x 10<sup>5</sup> gallons of water needed

(b) mass of water = 4.8 x 10<sup>5</sup> gal ×  $\frac{1000 \text{ cm}^3}{0.2642 \text{ gal}}$  ×  $\frac{1 \text{ g}}{1 \text{ cm}^3}$  ×  $\frac{1 \text{ kg}}{1000 \text{ g}}$  = 1.8 x 10<sup>6</sup> kg

$$\textcircled{82} \text{ N}_2(\text{l}) \quad \text{b.p.} = 77.36 \text{ K}$$

$$\textcircled{a} \text{ temp in } ^\circ\text{C} = 77.36 \text{ K} - 273.15 = \boxed{-195.79 ^\circ\text{C}}$$

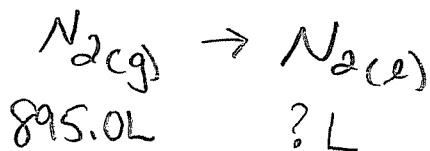
$\textcircled{b}$   $\star$  don't need to know

$$\frac{9}{5}(-195.79 ^\circ\text{C}) + 32 = \boxed{-320.35 ^\circ\text{F}}$$

$$\textcircled{c} \text{ density} = \frac{809 \text{ g}}{\text{L liquid}}$$

$$\text{density}_{\text{gas}} = 4.566 \text{ g/L}$$

How many liters of liquid nitrogen are produced when  
895.0L of  $\text{N}_2$  gas <sup>liquified</sup> at 77.36 K?



$$895.0\text{L} \times \frac{4.566\text{g}}{1\text{L}} =$$

$$4086.57 \text{ g N}_2 \times \frac{1\text{L}}{809\text{g}} = 5.05\text{L}$$

Convert to

L of liquid  $\text{N}_2$  using density

84

- a) Physical change = A
- b) Chemical change = B
- c) different physical properties = A + B
- d) different chemical properties = B
- e) change in state = A