

Mesa College - Chem 152

Practic Problems - 3/25/2009

P.1

$$\textcircled{1} \quad \text{Density} = \frac{m}{V} = \frac{91.2g}{8.00\text{cm}^3} = \boxed{1.14 \text{ g/cm}^3}$$

$$\textcircled{2} \quad 10.0 \text{ gal} \times \left(\frac{3.785 \text{ L}}{1 \text{ gal}} \right) = \boxed{37.9 \text{ L}}$$

$$\textcircled{3} \quad 75 \text{ lb} \cdot \left(\frac{453.6g}{1 \text{ lb}} \right) = \boxed{34000 \text{ g}}$$

$$\textcircled{4} \quad 15 \text{ miles} \cdot \left(\frac{5280 \text{ ft}}{1 \text{ mi}} \right) \cdot \left(\frac{12 \text{ in}}{1 \text{ ft}} \right) \cdot \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right) \cdot \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) \\ = \boxed{2.4 \times 10^4 \text{ m}}$$

$$\textcircled{5} \quad 53 \text{ yrs} \cdot \left(\frac{365.25 \text{ days}}{1 \text{ yr}} \right) \cdot \left(\frac{24 \text{ hr}}{1 \text{ day}} \right) \cdot \left(\frac{60 \text{ min}}{1 \text{ hr}} \right) \cdot \left(\frac{60 \text{ sec}}{1 \text{ min}} \right) \cdot \left(\frac{1 \text{ Msec}}{10^6 \text{ sec}} \right) \\ = \boxed{1.7 \times 10^3 \text{ Ms}}$$

$$\textcircled{6} \quad 2 \text{ L} \times \left(\frac{10^3 \text{ mL}}{1 \text{ L}} \right) \cdot \left(\frac{1 \text{ cm}^3}{1 \text{ mL}} \right) = \boxed{2000 \text{ cm}^3}$$

$$\textcircled{7} \quad 15 \text{ g} \times \left(\frac{1 \text{ mL}}{8.96 \text{ g}} \right) = \boxed{1.7 \text{ mL}}$$

$$\textcircled{8} \quad \frac{13.6 \text{ g}}{1 \text{ mL}} \left(\frac{1 \text{ lb}}{453.6 \text{ g}} \right) \left(\frac{1000 \text{ mL}}{1 \text{ L}} \right) \left(\frac{3.785 \text{ L}}{1 \text{ gal}} \right) = \boxed{113 \text{ L}}$$

$$\textcircled{9} \text{ (a)} \quad \frac{65 \text{ mi}}{\text{hr}} \times \left(\frac{5280 \text{ ft}}{1 \text{ mi}} \right) \left(\frac{1 \text{ hr}}{60 \text{ min}} \right) \left(\frac{1 \text{ min}}{60 \text{ sec}} \right) = \boxed{95 \text{ ft/sec}}$$

(95.33)

$$\textcircled{9} \text{ (b)} \quad 95.33 \frac{\text{ft}}{\text{sec}} \times \left(\frac{12 \text{ in}}{1 \text{ ft}} \right) \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right) \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) = \boxed{29 \text{ m/sec}}$$

(29.07)

$$\textcircled{9} \text{ (c)} \quad 29.07 \frac{\text{m}}{\text{s}} \times \left(\frac{1 \text{ Gm}}{10^9 \text{ m}} \right) \left(\frac{1 \text{ sec}}{10^9 \text{ ns}} \right) = \boxed{2.9 \times 10^{-17} \frac{\text{Gm}}{\text{ns}}}$$

$$\textcircled{10} \quad \begin{array}{l} V_f = 8.73 \text{ mL} \\ V_i = 5.03 \text{ mL} \\ \hline V = 3.70 \text{ mL} \end{array} \quad \left(\text{Assume } \delimiterscript{scale} \text{ reads in mL} \right)$$

$$D = \frac{m}{V} = \frac{12.1 \text{ g}}{3.70 \text{ mL}} = \boxed{3.27 \text{ g/mL}}$$

11 (a) Area = $L \times W = (90 \text{ ft})^2$ ← (one sig fig, as shown on diagram)
 $= \boxed{8000 \text{ ft}^2}$ (8100 ft²)

(b) $8100 \text{ ft}^2 \times \left(\frac{12 \text{ in}}{1 \text{ ft}}\right)^2 = \boxed{1 \times 10^6 \text{ in}^2}$
 (1,664,000)

(c) $1,664,000 \text{ in}^2 \left(\frac{2.54 \text{ cm}}{1 \text{ in}}\right)^2 = \boxed{8 \times 10^6 \text{ cm}^2}$
 (7,525,146)

(d) $7,525,146 \text{ cm}^2 \left(\frac{1 \text{ m}}{100 \text{ cm}}\right)^2 \left(\frac{1 \text{ km}}{1000 \text{ m}}\right)^2 = \boxed{8 \times 10^{-4} \text{ km}^2}$

(e) $8100 \text{ ft}^2 \times \left(\frac{1 \text{ acre}}{43560 \text{ ft}^2}\right) = \boxed{0.2 \text{ acres}}$

12 $V = \cancel{\text{Area}} (5.0 \text{ ft}) (32 \text{ ft}) (14 \text{ ft}) = \boxed{2200 \text{ ft}^3}$
 (2240)

13 $2240 \text{ ft}^3 \times \left(\frac{12 \text{ in}}{1 \text{ ft}}\right)^3 \left(\frac{2.54 \text{ cm}}{1 \text{ in}}\right)^3 \left(\frac{1 \text{ mL}}{1 \text{ cm}^3}\right) \left(\frac{1 \text{ L}}{10^3 \text{ mL}}\right) \left(\frac{1 \text{ gal}}{3.7854 \text{ L}}\right)$
 $= \boxed{17000 \text{ gal}}$

$$(14) \quad 10.0 \text{ lb water} \times \left(\frac{3.5 \text{ lb salt}}{100 \text{ lb water}} \right) = \boxed{0.35 \text{ lb salt}}$$

$$(15) \quad 42 \text{ gal alcohol} \times \left(\frac{100 \text{ gal Rum}}{75.5 \text{ gal alcohol}} \right) \left(\frac{3.785 \text{ L}}{1 \text{ gal}} \right) = \boxed{210 \text{ L of Rum}}$$

$$(16) \quad 162.5 \text{ mi} \times \left(\frac{1 \text{ gal}}{56.1 \text{ mi}} \right) \left(\frac{\$2.119}{1 \text{ gal}} \right) = \boxed{\$6.14}$$

(17) Measure dimensions of room $V = L \times W \times H$
Example

$$V = (13 \text{ yd}) (3 \text{ yd}) (15 \text{ yd}) = 585 \text{ yd}^3$$

width height length

Plan: $\text{yd}^3 \rightarrow \text{ft}^3 \rightarrow \text{in}^3 \rightarrow \text{cm}^3 \rightarrow \text{mL} \rightarrow \text{L} \rightarrow \text{gal}$

$\rightarrow \text{qt} \rightarrow \text{pt} \rightarrow \text{cup} \rightarrow \text{fl. oz.} \rightarrow \text{\$}$

$$585 \text{ yd}^3 \left(\frac{3 \text{ ft}}{1 \text{ yd}} \right)^3 \left(\frac{12 \text{ in}}{1 \text{ ft}} \right)^3 \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right)^3 \left(\frac{1 \text{ mL}}{1 \text{ cm}^3} \right) \left(\frac{1 \text{ L}}{10^3 \text{ mL}} \right) \left(\frac{1 \text{ gal}}{3.785 \text{ L}} \right)$$

$$\times \left(\frac{4 \text{ qt}}{1 \text{ gal}} \right) \left(\frac{2 \text{ pt}}{1 \text{ qt}} \right) \left(\frac{2 \text{ cup}}{1 \text{ pt}} \right) \left(\frac{8 \text{ fl. oz.}}{1 \text{ cup}} \right) \left(\frac{\$2.00}{1 \text{ fl. oz.}} \right)$$

$$= \boxed{\$3.0 \times 10^7}$$