

# UNIT 1 HW 3 PART 5

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1.  $1c = .200g$   $5c = ?g$   $(5c) \left( \frac{.200g}{c} \right) = 1g = \text{mass of } 5c$

$$\rho = \frac{M}{V} \quad 3.51g/cm^3 = \frac{1g}{V} \quad (3.51g/cm^3)(V) = 1g$$

$$V = \frac{1g}{3.51g/cm^3} = (.285 cm^3 = \text{VOL OF A } 5 \text{ CENT DIME})$$

2.  $V = 2.8 \text{ ml} = 2.8 cm^3$   $mass = ?$   $\rho = 3.57 \frac{g}{cm^3}$

$$\rho = \frac{M}{V} \quad \rho \cdot V = M \quad (3.51g/cm^3)(2.8 cm^3) = 9.83g = M$$

3.  $\rho_{H_2} = .0899 \frac{g}{L} = ? g/cm^3$   $(.0899 \frac{g}{L}) \left( \frac{1L}{1000 ml} \right) = .000899 \frac{g}{ml}$

$$= 8.99 \times 10^{-5} \frac{g}{ml} \left( \frac{1 ml}{1 cm^3} \right) = 8.99 \times 10^{-5} \frac{g}{cm^3}$$

4.  $\rho = \frac{M}{V}$   $\rho = 8.99 \times 10^{-5} g/cm^3$   $m = 2.02g$   $V = ?$

$$V = \frac{M}{\rho} = \frac{2.02g}{8.99 \times 10^{-5} g/cm^3} = 22469.41 cm^3$$

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$$\left( 22469.41 \text{ ml} \right) \left( \frac{1L}{1000 ml} \right) = 22.47L$$

# U1 HW 3 PART 5 (CONT'D)

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5.  $D = .0899 \text{ g/L}$     $V = 2 \times 10^5 \text{ m}^3$     $M = ?$

$$V = (2 \times 10^5 \text{ m}^3) \left( \frac{1,000,000 \text{ cm}^3}{\text{m}^3} \right) = 2 \times 10^{11} \text{ cm}^3$$

$$D = .0899 \text{ g/L} = 8.99 \times 10^{-5} \frac{\text{g}}{\text{ml}} \xrightarrow{\text{FROM \#3}} = 8.99 \times 10^{-5} \frac{\text{g}}{\text{cm}^3}$$

$$D \cdot V = M = \left( 8.99 \times 10^{-5} \frac{\text{g}}{\text{cm}^3} \right) (2 \times 10^{11} \text{ cm}^3)$$

$$= 1.7980000 \text{ g}$$

$$= \boxed{1.798 \times 10^7 \text{ g}}$$

6.  $2.7 \text{ g/cm}^3 = ? \frac{\text{kg}}{\text{m}^3}$

$$\left( 2.70 \frac{\text{g}}{\text{cm}^3} \right) \left( \frac{1 \text{ kg}}{1000 \text{ g}} \right) = .0027 \frac{\text{kg}}{\text{cm}^3}$$

$$\left( .0027 \frac{\text{kg}}{\text{cm}^3} \right) \left( \frac{1,000,000 \text{ cm}^3}{1 \text{ m}^3} \right) = 2700 \frac{\text{kg}}{\text{m}^3}$$

7.  $D_{\text{IAM}} = 1 \times 10^{-15} \text{ m}$        $MASS = 1.67 \times 10^{-24} \text{ g}$

$$DENSITY = ? = \frac{MASS}{VOLUME}$$

$$VOLUME \text{ OF A SPHERE} = \frac{4}{3} \pi r^3$$

$$r = \frac{DIAM}{2} = \frac{1 \times 10^{-15} \text{ m}}{2} = .5 \times 10^{-15} \text{ m}$$

$$r = 5 \times 10^{-16} \text{ m}$$

$$\left( 5 \times 10^{-16} \text{ m} \times \frac{100 \text{ cm}}{1 \text{ m}} \right) = 5 \times 10^{-14} \text{ cm} = r$$

$$VOL = \frac{4}{3} \pi (5 \times 10^{-14} \text{ cm})^3 = 5.24 \times 10^{-40} \text{ cm}^3$$

$$\rho = \frac{M}{V} = \frac{1.67 \times 10^{-24} \text{ g}}{5.24 \times 10^{-40} \text{ cm}^3} = 3.19 \times 10^{15} \frac{\text{g}}{\text{cm}^3}$$