

## CHEQ 1094 MEASUREMENT PROBLEM SET: ANSWERS

1. (a) 4 (b) 3 (c) 5 (d) 4
2. (a)  $3.88 \times 10^3$  (b) 6.41 (c) 90.0 (d) 40.0 (e) 0.00235
3. (a)  $6.548976 \times 10^6$  (b)  $3.42 \times 10^{-6}$  (c)  $3.456986 \times 10^3$
4. (a)  $2.7 \times 10^4$  (b) 68.4 (c)  $2.868 \times 10^2$  (d)  $3.35 \times 10^5$

5. (a) No. of g =  $67 \text{ mg} \times \frac{1 \text{ g}}{10^3 \text{ mg}} = 0.067 \text{ g}$

(b) No. of cm =  $753 \text{ km} \times \frac{10^3 \text{ m}}{1 \text{ km}} \times \frac{10^2 \text{ cm}}{1 \text{ m}} = 7.53 \times 10^7 \text{ cm}$

(c) No. of m =  $3.45 \times 10^{-3} \text{ mm} \times \frac{10^{-3} \text{ m}}{1 \text{ mm}} = 3.45 \times 10^{-6} \text{ m}$

(d) No. of  $\text{cm}^3$  =  $23 \text{ m}^3 \times \frac{(10^2 \text{ cm})^3}{(1 \text{ m})^3} = 2.3 \times 10^7 \text{ cm}^3$

(e) No. of  $\text{km}^2$  =  $345 \text{ mm}^2 \times \frac{(1 \text{ m})^2}{(10^3 \text{ mm})^2} \times \frac{(1 \text{ km})^2}{(10^3 \text{ m})^2} = 3.45 \times 10^{-10} \text{ km}^2$

6.  $\frac{\text{meters}}{\text{sec}} = \frac{100.8 \text{ miles}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} \times \frac{1.61 \text{ km}}{1 \text{ mile}} \times \frac{10^3 \text{ m}}{1 \text{ km}}$   
 $= 45.1 \text{ meters/sec}$

7.  $\frac{\text{lb}}{\text{ft}^3} = \frac{2.70 \text{ g}}{1 \text{ cm}^3} \times \frac{1 \text{ lb}}{454 \text{ g}} \times \frac{(2.54 \text{ cm})^3}{(1 \text{ in})^3} \times \frac{(12 \text{ in})^3}{(1 \text{ ft})^3} = 168 \text{ lb/ft}^3$

8. volume =  $23.5 \text{ g} \times \frac{1 \text{ mL}}{0.67 \text{ g}} = 35 \text{ mL}$

9. mass =  $65.8 \text{ mL} \times \frac{0.90 \text{ g}}{1 \text{ mL}} = 59 \text{ g}$

10. mass of bromine =  $(174.0592 - 27.6578) \text{ g} = 146.4014 \text{ g}$   
volume of bromine = volume of flask = 50.0 mL

$$\text{density} = \frac{146.4014 \text{ g}}{50.0 \text{ mL}} = 2.93 \text{ g/mL}$$

11. mass of water =  $(93.34 - 68.31) \text{ g} = 25.03 \text{ g}$

$$\text{volume of water} = 25.03 \text{ g} \times \frac{1 \text{ mL}}{0.9980 \text{ g}} = 25.08 \text{ mL}$$

$$\text{volume of container} = 25.08 \text{ mL}$$

$$\text{volume of unknown liquid} = 25.08 \text{ mL}$$

$$\text{mass of unknown liquid} = (88.42 - 68.31) \text{ g} = 20.11 \text{ g}$$

$$\text{density of unknown liquid} = \frac{20.11 \text{ g}}{25.08 \text{ mL}} = 0.8018 \text{ g/mL}$$

12. mass of idol =  $1.00 \text{ L} \times \frac{10^3 \text{ mL}}{1 \text{ L}} \times \frac{1 \text{ cm}^3}{1 \text{ mL}} \times \frac{19.32 \text{ g}}{1 \text{ cm}^3}$

$$= 19.32 \times 10^3 \text{ g} = 19.32 \text{ kg}$$

The idol weighs about 42 lb; a bit too heavy to catch!

13. (a)  $^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32}{1.8} = \frac{365 - 32}{1.8} = \frac{333}{1.8} = 185^{\circ}\text{C}$

$$(b) ^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32 = (1.8 \times 87) + 32 = 1.9 \times 10^2 ^{\circ}\text{F}$$

$$(c) ^{\circ}\text{C} = \frac{14 - 32}{1.8} = \frac{-18}{1.8} = -10^{\circ}\text{C}$$

$$(d) ^{\circ}\text{F} = [1.8 \times (-28)] + 32 = -18^{\circ}\text{F}$$

$$(e) \text{K} = ^{\circ}\text{C} + 273 = 29 + 273 = 302 \text{ K}$$

$$(f) ^{\circ}\text{C} = \text{K} - 273 = 313 - 273 = 40^{\circ}\text{C}$$

$$^{\circ}\text{F} = (1.8 \times 40) + 32 = 104^{\circ}\text{F}$$