

MATTER & MINERALS

CHEMISTRY HOMEWORK - FALL - WEEK 1

Chapter ①

of significant figures

- ②⑤
- | | |
|---------------------------------------|---|
| (a) $12 = 1.2 \times 10^1$ | 2 |
| (b) $1098 = 1.098 \times 10^3$ | 4 |
| (c) $2001 = 2.001 \times 10^3$ | 4 |
| (d) 2.001×10^3 | 4 |
| (e) $0.0000101 = 1.01 \times 10^{-5}$ | 3 |
| (f) 1.01×10^{-5} | 3 |
| (g) $1000. = 1.000 \times 10^3$ | 4 |
| (h) $22.04030 = 2.204030 \times 10^1$ | 7 |

③① (a) $4.184 \times 100.62 \times (25.27 - 24.16) = 420.99408 \times 1.11$
 $= 467.303$
 $= \underline{\underline{467}}$

(b) $\frac{8.925 - 8.904}{8.925} \times 100 = \frac{0.021 \times 100}{8.925} = 0.2352941176$
 $= \underline{\underline{0.24}}$

(c) $(9.04 - 8.23 + 21.954 + 81.0) \div 3.1416 =$
 $103.8 \div 3.1416 = 33.02903$
 $= \underline{\underline{33.03}}$

(d)
$$\frac{9.2 \times 100.65}{8.321 + 4.026} = \frac{925.98}{12.347} = \frac{74.9}{\cancel{74.9}} = \underline{\underline{75}}$$

(e)
$$0.1654 + 2.07 - 2.114 = 0.1214 = \underline{\underline{0.12}}$$

(f)
$$8.27 (4.987 - 4.962) = 0.20675 \rightarrow 0.20$$

$$\begin{matrix} 8.27 & \times & 0.025 \\ \underbrace{}_{3 \text{ sig. fig}} & & \underbrace{}_{2 \text{ sig. fig}} \end{matrix} = \underline{\underline{0.21}}$$

(g)
$$\frac{9.5 + 4.1 + 2.8 + 3.175}{4} = \frac{19.575}{4} = 4.89375$$

$$= \underline{\underline{4.9}}$$

(h)
$$\frac{9.025 - 9.024}{9.025} \times 100 = 0.011080332$$

$$= 1.1080332 \times 10^{-2}$$

$$= \underline{\underline{1 \times 10^{-2}}}$$

Note: $9.025 - 9.024 = 0.001$ (1 sig. fig)

33 (a)
$$8.43 \text{ cm} \times \frac{10 \text{ mm}}{1 \text{ cm}} = \underline{\underline{84.3 \text{ mm}}}$$

(b)
$$2.41 \times 10^2 \text{ cm} \times \frac{1 \text{ m}}{100 \text{ cm}} = \underline{\underline{2.41 \text{ m}}}$$

(c)
$$294.5 \text{ nm} \times \frac{1 \text{ m}}{10^9 \text{ nm}} \times \frac{100 \text{ cm}}{1 \text{ m}} = \underline{\underline{294.5 \times 10^{-7} \text{ cm}}}$$

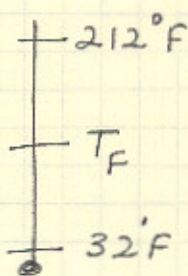
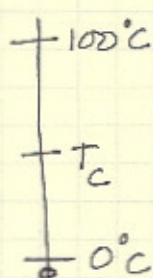
$$(d) 1.445 \times 10^4 \text{ m} \times \frac{\text{km}}{10^3 \text{ m}} = \underline{\underline{14.45 \text{ km}}}$$

$$(e) 235.3 \text{ m} \times \frac{10^3 \text{ mm}}{\text{m}} = \underline{\underline{235.3 \times 10^3 \text{ mm}}}$$

$$(f) 903.3 \text{ nm} \times \frac{\text{m}}{10^9 \text{ nm}} \times \frac{10^6 \mu\text{m}}{\text{m}} = \underline{\underline{903.3 \times 10^{-3} \mu\text{m}}}$$

(49)

(a)



$$\frac{T_C - 0}{100 - 0} = \frac{T_F - 32}{212 - 32}$$

$$\frac{T_C}{100} = \frac{T_F - 32}{180} \quad \text{--- (1)}$$

$$T_C = 78.1^\circ\text{C}$$

$$T_K = T_C + 273.15 = \underline{\underline{351.3 \text{ K}}}$$

$$\frac{78.1}{100} = \frac{T_F - 32}{180} \Rightarrow \left(\frac{78.1}{100} \times 180 \right) + 32 = T_F$$

$$T_F = 172.58^\circ\text{F}$$

$$T_F = \underline{\underline{173^\circ\text{F}}}$$

$$T_K = 78.1 + 273.15 = \underline{\underline{351.3 \text{ K}}}$$

$$(b) T_C = -25^\circ\text{C}$$

$$\frac{-25}{100} = \frac{T_F - 32}{180}$$

$$T_F = \left(\frac{-25}{100} \times 180 \right) + 32 = \underline{\underline{-13^\circ\text{F}}}$$

$$T_K = (-25 + 273.15) \text{ K} = \underline{\underline{248 \text{ K}}}$$

$$(e) -273^{\circ}\text{C} = T_c$$

$$\frac{-273}{100} = \frac{T_F - 32}{180}$$

$$T_F = \left(\frac{-273}{100}\right) 180 + 32 = -459.4 = \underline{\underline{-459^{\circ}\text{F}}}$$

$$T_K = -273 + 273.15 = \underline{\underline{0.15\text{ K}}} \text{ or } \underline{\underline{0\text{ K}}}$$

$$(d) T_c = 801^{\circ}\text{C} \quad \frac{801}{100} = \frac{T_F - 32}{180}$$

$$T_F = \left(\frac{801}{100}\right) 180 + 32 = 1473.8^{\circ}\text{F} = \underline{\underline{147 \times 10^1 \text{ } ^{\circ}\text{F}}}$$

$$T_K = 273.15 + 801 = 1074.15\text{ K} = \underline{\underline{107 \times 10^1 \text{ K}}}$$

$$(60) \text{ density} = \frac{\text{mass}}{\text{volume}} \Rightarrow \text{volume} = \frac{\text{mass}}{\text{density}}$$

$$\text{volume of silver} = \frac{5.25\text{ g}}{10.5\text{ g cm}^{-3}}$$

$$= 0.5 \text{ cm}^3 = 0.5 \text{ mL}$$

$$\left. \begin{array}{l} \text{initial volume of water} \\ \text{in graduated cylinder} \end{array} \right\} = 11.2 \text{ mL}$$

$$\left. \begin{array}{l} \therefore \text{Final volume of water} \\ \text{in graduated cylinder} \end{array} \right\} = 11.2 \text{ mL} + 0.5 \text{ mL} \\ = \underline{\underline{11.7 \text{ mL}}}$$

(65)	solid	liquid	gas
	definite shape	takes the shape of the container	fills up the container
	atoms are packed close together	atoms are loosely packed allowing to pour liquids (flows)	atoms are not packed together
	has its own volume		flows from one place to another
	does not flow		

(66) homogeneous - cannot distinguish the components of the mixture by physical (visibly indistinguishable)

heterogeneous - can distinguish the components of the mixture by physical means. (visibly distinguishable)

(a) soil - heterogeneous

(b) atmosphere - homogeneous (heterogeneous if you count dust particles)

(c) carbonated soft drink - heterogeneous (counting bubbles)

(d) gasoline - homogeneous

(e) gold - pure gold is an element. gold jewellery is a homogeneous mixture.

(f) ethanol + water - homogeneous

- 68 (a) water = pure = compound
 (b) blood = mixture
 (c) oceans = mixture
 (d) iron = pure = element
 (e) brass = mixture
 (f) uranium = pure = element
 (g) wine = mixture
 (h) leather = mixture
 (i) NaCl = pure = compound

- 69 (a) physical
 (b) chemical
 (c) physical
 (d) chemical

Chapter 2

- 43 (a) ${}_{94}^{238}\text{Pu}$ $p = 94$ $p+n = 238$ $n = 238 - 94 = \underline{\underline{144}}$
- (b) ${}_{29}^{65}\text{Cu}$ $p = 29$ $n = 65 - 29 = \underline{\underline{36}}$
- (c) ${}_{24}^{52}\text{Cr}$ $p = 24$ $n = 52 - 24 = \underline{\underline{28}}$
- (d) ${}_{2}^{4}\text{He}$ $p = 2$ $n = 4 - 2 = \underline{\underline{2}}$

$$(e) \begin{array}{c} 60 \\ 27 \end{array} \text{Co} \quad p=27 \quad n=60-27 = \underline{\underline{33}}$$

$$(f) \begin{array}{c} 54 \\ 24 \end{array} \text{Cr} \quad p=24 \quad n=54-24 = \underline{\underline{30}}$$

$$(45) (a) \begin{array}{c} 12 \\ 5 \end{array} \text{B} \quad (b) \quad z=7 \quad n=8 \quad A=7+8=15 \quad \begin{array}{c} 15 \\ 7 \end{array} \text{N}$$

$$(c) \quad z=17 \quad n=18 \quad A=17+18=35 \quad \begin{array}{c} 35 \\ 17 \end{array} \text{Cl}$$

$$(d) \quad z=92 \quad n=143 \quad A=92+143=235 \quad \begin{array}{c} 235 \\ 92 \end{array} \text{U}$$

$$(e) \quad p=6 \quad A=14 \quad \begin{array}{c} 14 \\ 6 \end{array} \text{C}$$

$$(f) \quad p=15 \quad n=16 \quad A=15+16=31 \quad \begin{array}{c} 31 \\ 15 \end{array} \text{P}$$