

ANSWERS for CHEM I REVIEW

Chang - Chapter 1, #4, 12, 16, 22, 24, 26, 36, 44,
48, 54, 56, 58

p. 1 of 2

1.4 (a) is a hypothesis,* (b) is a law and (c) is a theory

* (a) is not a very good hypothesis, because it cannot be tested with an experiment.

1.12 (a) He balloon leaking = physical change

(b) Flashlight getting dimmer = chemical change* (batteries)

(c) Frozen O.J. reconst. = physical

(d) Photosynthesis = chemical

(e) Salt dissolving in soup = physical

* The production of light is physical, but a chemical change in the batteries supplies the necessary electrons.

1.16 (a) well water = solution (or maybe a mixture)

(b) Ar = element

(c) sucrose = compound

(d) red wine = solution (possibly mixture)

(e) chicken noodle soup = mixture

(f) blood = (heterogeneous) mixture

(g) ozone = element (O_3 , an allotrope of oxygen)

1.22 $D = \frac{m}{V}$ so $m = D \cdot V = 0.7918 \text{ g/mL} \cdot 89.9 \text{ mL} = 71.18282 \text{ g}$ (71.2g)

1.24 $(^{\circ}\text{F} - 32) \cdot \frac{5}{9} = ^{\circ}\text{C}$: $(105^{\circ}\text{F} - 32^{\circ}\text{F}) \cdot \frac{5}{9} = 40.5^{\circ}\text{C}$ (41^{\circ}\text{C})

$(\frac{9}{5}^{\circ}\text{C}) + 32 = ^{\circ}\text{F}$: $\frac{9}{5}(-11.5^{\circ}\text{C}) + 32 = 11.3^{\circ}\text{F}$ or 11^{\circ}\text{F} If 0.0^{\circ}\text{C} = 32.0^{\circ}\text{F} then keep 3 SF.

$(\frac{9}{5} \times 6300^{\circ}\text{C}) + 32 = 11340 + 32 = 11372^{\circ}\text{F}$ (11000^{\circ}\text{F}) or $1.1 \times 10^4^{\circ}\text{F}$

$(451^{\circ}\text{F} - 32) \cdot \frac{5}{9} = 232.7^{\circ}\text{C}$ (233^{\circ}\text{C})

1.26 77 K = (-196^{\circ}\text{C})* 4.2 K = (-269^{\circ}\text{C})* 601 K = (328^{\circ}\text{C})

(-196.15) -268.75 -269.0^{\circ}\text{C} (328^{\circ}\text{C})

* using $K + 273$
273.15
** using $K + 273$

1.36 a) $7.310 \text{ km} \div 5.70 \text{ km} = 1.28245614 \xrightarrow{3 \text{ SF}} 1.28 \text{ (no label)}$

b) $(3.26 \times 10^{-3} \text{ mg}) - (7.88 \times 10^{-5} \text{ mg}) \rightarrow \frac{0.00326}{0.0000788} \text{ mg} = 3.18 \times 10^{-3} \text{ mg}$

c) $\frac{4020000 \text{ dm}}{7740000 \text{ dm}} \times 81400000 \text{ dm} = 8.14 \times 10^7 \text{ dm}$

d) $(7.8 \text{ m} - 0.34 \text{ m}) / (1.15 \text{ s} + 0.82 \text{ s}) = 7.5 \text{ m} / 1.97 \text{ s} = 3.8 \text{ m/s}$

1.44 $\frac{1 \text{ mi}}{8.92 \text{ min}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{1 \text{ min}}{60 \text{ s}} = 118.3856502 \text{ in/s} = 118 \text{ in/s}$

$\times \frac{1609 \text{ m}}{1 \text{ mi}} = 180.3811659 \text{ m/min} = 180 \text{ m/min}$

$\times \frac{5 \text{ km}}{3.1 \text{ mi}} \times \frac{60 \text{ min}}{1 \text{ h}} = 10.84912484 \text{ km/h} = 11 \text{ km/h}$
or 10.8 km/h (Depends on what conv. you use.)

1.48 $\frac{0.62 \text{ g}}{1000000 \text{ g}} \times 6.0 \times 10^3 \text{ g} = 0.00372 \text{ g Pb} = 0.0037 \text{ g Pb}$

1.54 a) Rust = chemical

b) Ind. areas, acidic water = chemical & physical

c) Hemoglobin is red = physical

d) Evaporation = physical

e) $\text{CO}_2 \rightarrow$ complex molecules = chemical

1.56 $D = \frac{m}{V} = \frac{52.7064 \text{ g}}{(8.53 \text{ cm})(2.4 \text{ cm})(1.0 \text{ cm})} = 2.574560375 \text{ g/cm}^3 = 2.6 \text{ g/cm}^3$

1.58 $V = m/D = \frac{1360 \text{ g}}{0.953 \text{ g/mL}} = 1427.072403 \text{ mL} = \pi r^2 \cdot h = \pi r^2 \cdot 21.5 \text{ cm}$

$\pi r^2 = \frac{1427.072403 \text{ cm}^3}{21.5 \text{ cm} \cdot \pi}$

$r^2 = 21.12796531 \text{ cm}^2$

$r = \sqrt{21.12796531 \text{ cm}^2} = 4.59651665 \text{ cm}$ (Chang prob. rounded here)

$d = 2 \times r = 9.193033299 \text{ cm} = 9.19 \text{ cm}$ (Chang, 9.20 cm)