

Chem E-1a
Friday Review Problems
Chapters 1 and 2

1. Using your calculator, perform the following calculations. Round your answer to a maximum of three or four digits.

a) $\frac{1.006 \times 10^{-3}}{2.3 \times 10^8}$

$1.006 \times 10^{-3} = 0.001006$

1.006×10^{-3}
 ON CALCULATOR

"1.006 [EE] -3"
 [Exp]
 [x 10^x]

$= 4.37391304 \times 10^{-12}$

$= 4.374 \times 10^{-12}$
 OR
 4.37×10^{-12}

b) $(2.06 \times 10^2) + (1.32 \times 10^4) - (1.26 \times 10^3)$

$= 12146$

$= 12100$

OR 1.21×10^4

ETC...

c) $(5.2 + 3.31 + 7) \times (1.24 \times 10^6)$

15.51

$= 19232400$

$= 1.92 \times 10^7$

2. You may have heard the expression, "Give him an inch and he'll take a mile." In fact, the original expression was "Give him an inch and he'll take an *ell*." An *ell* is an old unit of length, which is defined as exactly 45 inches. What is the length of an ell in meters?

Note: 1 inch = 2.54 cm

$$1 \cancel{\text{ELL}} \times \frac{45 \cancel{\text{INCH}}}{1 \cancel{\text{ELL}}} \times \frac{2.54 \cancel{\text{cm}}}{1 \cancel{\text{INCH}}} \times \frac{1 \text{ m}}{100 \cancel{\text{cm}}} = 1.143 \text{ m}$$

3. Given the following units of volume and length:

1 barrel (of oil) = 0.1590 m³

1 mL = 1 cm³

1 ft = 12 inches

1 inch = 2.54 cm

1 kg = 2.205 pounds

$$0.85 \text{ g} = 1 \text{ mL}$$

USE $\frac{0.85 \text{ g}}{1 \text{ mL}}$ or $\frac{1 \text{ mL}}{0.85 \text{ g}}$

AS CONVERSION FACTORS

- a) A particular sample of crude oil has a density of 0.85 g/mL. Determine the mass of 1.00 barrel of this crude oil, in kilograms.

$$1.00 \cancel{\text{BAR}} \times \frac{0.1590 \cancel{\text{m}^3}}{1 \cancel{\text{BAR}}} \times \left(\frac{100 \cancel{\text{cm}}}{1 \cancel{\text{m}}} \right)^3 \times \frac{1 \cancel{\text{mL}}}{1 \cancel{\text{cm}^3}} \times \frac{0.85 \cancel{\text{g}}}{1 \cancel{\text{mL}}} \times \frac{1 \text{ kg}}{1000 \cancel{\text{g}}} = 135.2 \text{ kg}$$

$$\left(\frac{100 \cancel{\text{cm}}}{1 \cancel{\text{m}}} \right)^3 = \left(\frac{100^3 \cancel{\text{cm}^3}}{1^3 \cancel{\text{m}^3}} \right)$$

- b) Calculate the volume, in cubic feet, of 1.00 barrel of oil.

$$1.00 \text{ BAR} \times \frac{0.1590 \text{ m}^3}{1 \text{ BAR}} \times \frac{100^3 \cancel{\text{cm}^3}}{1^3 \cancel{\text{m}^3}} \times \frac{1^3 \cancel{\text{in}^3}}{2.54^3 \cancel{\text{cm}^3}} \times \frac{1^3 \cancel{\text{ft}^3}}{12^3 \cancel{\text{in}^3}} = 5.615 \text{ ft}^3$$

- c) Determine the density of oil in units of pounds per cubic foot.

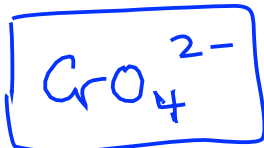
$$\frac{0.85 \cancel{\text{g}}}{1 \cancel{\text{mL}}} \times \frac{1 \cancel{\text{kg}}}{1000 \cancel{\text{g}}} \times \frac{2.205 \text{ POUNDS}}{1 \cancel{\text{kg}}} \times \frac{1 \cancel{\text{mL}}}{1 \cancel{\text{cm}^3}} \times \frac{2.54^3 \cancel{\text{cm}^3}}{1^3 \cancel{\text{in}^3}} \times \frac{12^3 \cancel{\text{in}^3}}{1^3 \cancel{\text{ft}^3}} = 53.1 \frac{\text{POUNDS}}{\text{ft}^3}$$

$\underbrace{\quad}_{\text{g} \rightarrow \text{POUNDS}} \quad \underbrace{\quad}_{\text{mL} \rightarrow \text{ft}^3}$

$= 53.1 \text{ POUNDS} / \text{ft}^3$
 $= \frac{53.1 \text{ POUNDS}}{1 \text{ ft}^3}$

MAKE

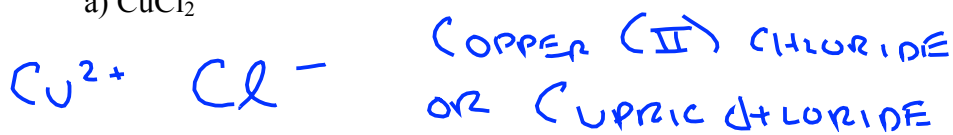
FLASH CARDS :



CHROMATE

4. I) Write an acceptable chemical name for each of the following:

a) CuCl_2



b) Hg_2I_2



c) S_2F_4

DISULFUR TETRAFLUORIDE

d) KOH



e) V_2O_5 (note: V = Vanadium)



f) CO_3^{2-}

CARBONATE ION

g) H_2

HYDROGEN

h) H_3PO_4

PHOSPHORIC ACID

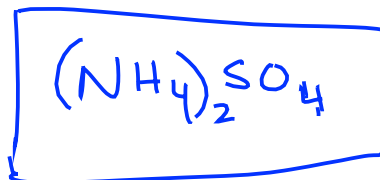
i) NH_3

AMMONIA

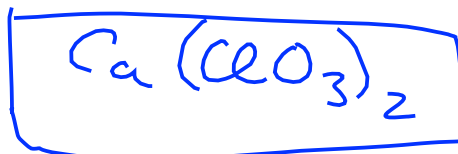
Do NOT write: $(\text{NH}_4^+)_2\text{SO}_4^{2-}$

II) Write the chemical formula for each of the following:

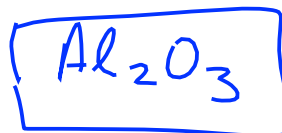
a) Ammonium Sulfate



b) Calcium Chlorate



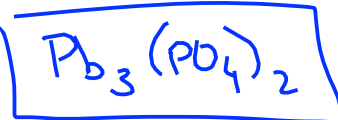
c) Aluminum Oxide



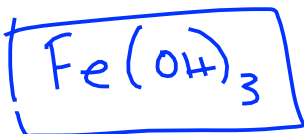
d) Sulfur Hexafluoride



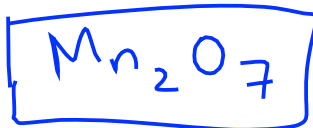
e) Lead (II) Phosphate



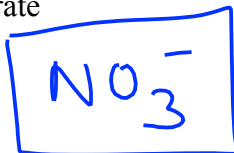
f) Ferric Hydroxide



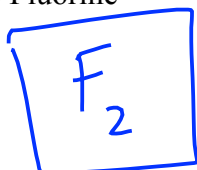
g) Manganese (VII) Oxide



h) Nitrate



i) Fluorine



SO_3 = SULFUR
TRIOXIDE

SO_3^{2-} = SULFITE
ION

MAGNESIUM OXIDE

