CHM 1142   Exam 3

200 points total

30 points 1)   Write formulas or give names for:

potassium nitrate_____ $NaMnO_4$_____

chlorous acid_____   iron (III) sulfide_____

H_3PO_3_____   ferric sulfate_____

20 points 2)   Answer the following by circling the correct choice:

The energy of a photon is $^{inversely/directly}$ proportional to its frequency

The wavelength of a photon is $^{inversely/directly}$ proportional to its frequency.

An x-ray photon is $^{lower/higher}$ in energy than a microwave photon

Ammonium sulfide is $^{soluble/insoluble}$ in water

Blue light has a $^{higher/lower}$ frequency than red light

There is no rational, scientific basis to believe that cell phone radiation can cause cancer $^{True/False}$

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TUD Department of Chemistry
200 points total   **Fall 2017**
                                     Page 2 of 5

40 points 3)   Write net ionic equations for the reaction that occurs, if any, when aqueous solutions of the following are mixed (write NR if no reaction occurs):

a) NaI and $AgC_2H_3O_2$

b) zinc(II) nitrate and sodium hydroxide

c) NaOH and $FeCl_3$

d) sodium sulfide and cuprous chloride

e) hydrofluoric acid and potassium hydroxide

f) $(NH_4)_2CO_3$ and $NiCl_2$

g) sodium sulfate and potassium nitrate
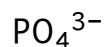
h) hydrochloric acid and sodium hydroxide

50 points   4) Answer the following:

a)   What is the frequency of electromagnetic radiation with a wavelength of 444 nm ?

b)   What is the energy of the radiation in a) above?

c)   Write the formulas for three strong acids.

d)   Circle insoluble compound(s):

$AgNO_3$ Ag_2S $AgCl$ $AgC_2H_3O_2$ $AgOH$ $HgCl_2$ Hg_2Cl_2

$CsBr_2$ $PbCl_2$ $Ba(NO_3)_2$ K_2SO_4 $(NH_4)_2SO_4$ $FePO_4$

e)   Write the oxidation number of P in

$PO_4{}^{3-}$

and in P_4O_{10}

15 pts   5)   A 25.00 mL sample of vinegar was titrated with 33.75 mL of 0.1990 M NaOH? Assuming that the only acid in the vinegar was acetic acid, what is the concentration of acetic acid in the vinegar?

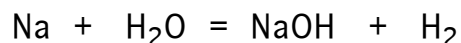15 pts   6)   What volume of 6 M HCl would be required to make 3.0 L of 0.050 M HCl?

15 pts   7)   How many grams of NaOH can be made from 1.80 g of water and excess sodium?

$$Na \; + \; H_2O \; = \; NaOH \; + \; H_2$$

15 pts   8) A soft drink contains 180 kilocalories. What is its energy content expressed as kiloJoules (1 cal = 4.184 J)

15 point bonus: An unknown compound was found to contain 78.77% C; 5.09% H; 16.14% O. Its molecular weight was found to be 198.2 g/mole. What is the molecular formula of the compound?