

# CHM 1142

## Exam 3

200 points total

TUD Department of Chemistry

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30 points 1) Write formulas or give names for:

potassium nitrate\_\_\_\_\_

NaMnO<sub>4</sub>\_\_\_\_\_

chlorous acid\_\_\_\_\_

iron (III) sulfide\_\_\_\_\_

H<sub>3</sub>PO<sub>3</sub>\_\_\_\_\_

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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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  $\text{AgC}_2\text{H}_3\text{O}_2$

b) zinc(II) nitrate and sodium hydroxide

c) NaOH and  $\text{FeCl}_3$

d) sodium sulfide and cuprous chloride

e) hydrofluoric acid and potassium hydroxide

f)  $(\text{NH}_4)_2\text{CO}_3$  and  $\text{NiCl}_2$

g) sodium sulfate and potassium nitrate

h) hydrochloric acid and sodium hydroxide

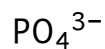
50 points 4) Answer the following:

- 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<sub>3</sub> Ag<sub>2</sub>S AgCl AgC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> AgOH HgCl<sub>2</sub> Hg<sub>2</sub>Cl<sub>2</sub>

CsBr<sub>2</sub> PbCl<sub>2</sub> Ba(NO<sub>3</sub>)<sub>2</sub> K<sub>2</sub>SO<sub>4</sub> (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> FePO<sub>4</sub>

- e) Write the oxidation number of P in



and in P<sub>4</sub>O<sub>10</sub>

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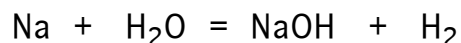
200 points total

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?

200 points total

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



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?