Final Exam Twitter Review #3

FE3-1: How many protons and electrons are in a Cu^{2+} - 64 ion, respectively?

   - Answer: 29 p+ ; 27 e-

FE3-2: What is the name of the compound with the chemical formula $CrCl_3$?

   - Answer: Chromium (III) Chloride

FE3-3: If two oxygen atoms combine to make a molecule, what type of bond will they form? Be very specific.

   - Answer: (Double) Covalent Nonpolar Bond

FE3-4: Earnest Rutherford noticed alpha particles went straight through gold foil in his gold foil exp. What can be concluded about an atom?

   - Answer: Most of an atom is empty space.

FE3-5: How does an N^{3-} ion differ from an electrically neutral nitrogen atom?

   - Answer: # of electrons (N^{3-} has 3 more electrons)

FE3-6: A gas under a pressure of 74 mmHg and a temp of 75°C occupies a 500.0-L container. How many moles of gas are in the container?

   - Answer: PV=nRT → n=1.7 moles

FE3-7:
A) What is the density of a 100. g sample of metal that occupies 9.00 cm^3?
B) What is the identity of this metal?

   - Answer: A) 11.1 g/cm^3 B) Lead

FE3-8: How many total orbitals are contained in a "d" block element in the third energy level?

   - Answer: $3d^{10}$ → 5 Orbitals

FE3-9: What is the volume (L) of 2.00 moles of nitrogen gas (N_2) at STP?

   - Answer: 44.8 L N_2(g)

FE3-10: What volume (L) of C_2H_2 is required to form 40.0 L of CO_2 at STP? __ $C_2H_2(g)$ + __ $O_2(g)$ → __ $H_2O(g)$ + __$CO_2(g)$

- Answer: 2,5,2,4 → 20.0 L $C_2H_2(g)$

FE3-11: In an experiment, 2.62 g of iron react completely with 1.50 g of sulfur. What is the empirical formula for the compound produced?

- Answer: EF = FeS

FE3-12: What is true about the electron configuration of K^{1+} , Ca^{2+} , and Cl^{1-} ? Be very specific.

- Answer: Same electron configuration as Argon

FE3-13: When K-42 undergoes radioactive decay, the result is two products, one of which is Ca-42. What is the other product?

- Answer: Beta particle

FE3-14: A catalyst speeds up rxn by lowering activation energy. But, which energy measure will remain unchanged? (potential energy diagram)

- Answer: Heat of Reaction ($\Delta Hrxn$)

FE3-15: What type of chemical reaction is represented by: 1 S_8 + 8 O_2 → 8 SO_2

- Answer: Synthesis

FE3-16: Balance the following reaction: __LiOH + __CO_2 → __Li_2CO_3 + __H_2O

- Answer: 2,1,1,1

FE3-17: Neutralization occurs when 15.0 mL of KOH react with 25.0 mL of HNO_3. If molarity of HNO_3 is 0.750M, what is the molarity of KOH?

- Answer: $M_aV_a=M_bV_b$ → 1.25 M KOH

FE3-18: In a phase diagram of any substance, at which point do solid, liquid, and gas phases exist in equilibrium?

- Answer: Triple Point

FE3-19: Using a solubility curve graph, what is the identity of the substance if 40 g of solute is saturated at 25°C? (Assume in 100 g H_2O)

- Answer: Potassium Nitrate (KNO_3)

FE3-20: What is the correct chemical formula for sodium sulfate?

- Answer: Na2SO4

FE3-21: In a container, 15.9 L of gas is under 589 kPa of pressure at 56.5°C. If pressure and temp change to STP, what is the new volume?

- Answer: Combined Gas Law → P1V1/T1 = P2V2/T2 → V2 = 76.6 L

FE3-22: What are the TWO differences between the following isotopes of hydrogen?: H-1 ; H-2 (deuterium) ; H-3 (tritium)

- Answer: # n^0 and mass #

FE3-23: What is the correct name for the acid whose chemical formula is H3N?

- Answer: Hydronitric Acid

FE3-24: Which element is located in Group 2 (IIA) and Period 6 of the periodic table?

- Answer: Barium (Ba)

FE3-25: How many moles are in 325 g of (NH4)2Cr2O7 ?

- Answer: 1.29 moles (NH4)2Cr2O7

FE3-26: Which compound contains the greatest percent of oxygen by mass?
A) CO2
B) NO2
C) SO2
D) SiO2

- Answer: % Composition → A) CO2

FE3-27: How many moles of KCl are produced when 4.25 moles of KClO3 decompose?
__KClO3 → __KCl + __O2

- Answer: 4.25 mol KCl

FE3-28: How many grams of HgO will be produced when 44 g of Hg react with excess O2? __Hg + __O2 → __HgO

- Answer: 48 g HgO

FE3-29: Which e- transition in hydrogen atom will result in emission of red light?
A) n=2 to n=3
B) n=2 to n=4
C) n=3 to n=2
D) n=4 to n=2

- Answer: C) n=3 to n=2

FE3-30: Correct order of decreasing mass:
A) alpha, beta, neutron
B) alpha, neutron, beta
C) neutron, beta, alpha
D) neutron, alpha, beta

- Answer: B) alpha, neutron, beta

FE3-31: Predict the product(s) of this equation (no need to balance): Ba + CuCl2 → ?

- Answer: BaCl2 + Cu

FE3-32: What is the MOST important characteristic of a strong acid in solution?

- Answer: It completely ionizes (dissociates) in solution

FE3-33: What is the net ionic equation (N.I.E.) for the reaction between Pb(NO3)2 and HCl?

- Answer: 1 Pb^2+ (aq) + 2 Cl^1- (aq) → 1 PbCl2 (s)

FE3-34: When combined, two gases have a pressure of 4.0 atm. If one gas has a pressure of 1.5 atm, what is the pressure of the second gas?

- Answer: Dalton's Law of Partial Pressure → P2 = 2.5 atm

FE3-35: What compound has the chemical formula P2O5?

- Answer: Diphosphorus Pentoxide

FE3-36: Which elements have the same number of neutrons?
A) B-10 & C-12
B) Mn-55 & Fe-56
C) Ag-108 & Cd-112
D) Au-197 & Hg-201

- Answer: Mass Number = protons + neutrons → B) Mn-55 & Fe-56

FE3-37:
A) Based on the VSEPR theory, what is the molecular geometry of NF3?
B) Is this molecule polar or nonpolar?

   - Answer: A) MG = Trigonal Pyramidal   B) Polar (lone pair on central atom)

FE3-38: Which compound is soluble in water?
A) aluminum sulfide
B) calcium carbonate
C) iron (III) hydroxide
D) potassium sulfate

   - Answer: Use solubility rules on reference table → D) potassium sulfate (aq)

FE3-39: What is the identity of an element with the electron configuration [Xe]6s^2
4f^14 5d^10 6p^1

   - Answer: Thallium (Tl)

FE3-40: What is the percent by mass of N in Ca(CN)2?

   - Answer: % Comp → N = 30.4%

FE3-41: What is the molarity of 28.9 g of CaCl2 dissolved in water to make 0.78 L of
solution?

   - Answer: M=mol/L → 0.33 M CaCl2

FE3-42: The half-life of phosphorus-32 is 14.3 days. How much of a 20.0 g sample of
phosphorus-32 will remain after 57.2 days?

   - Answer: #H-L = Time/H-L → 1.25 g P-32 remain after 4 half-lives

FE3-43: To increase the temperature of 100. g of H2O(s) from -50.0°C to -10.0°C, how
much energy is required?

   - Answer: q=mCpΔT → q = 8.20 x 10^3 J

FE3-44: What is the [H+] of an HCl solution if the pH is measured to be 6.0?

   - Answer: [H+] = 10^-pH → [H+] = 1.0 x 10^-6 M HCl

FE3-45: What type of chemical reaction is represented by: 2 C4H10 + 13 O2 → 8 CO2 +
10 H2O

   - Answer: Combustion Reaction

FE3-46: If palladium is used as a catalyst in a chemical rxn, how does palladium increase speed of rxn? (think potential energy diagram)

- Answer: A catalyst lowers the activation energy (Ea)

FE3-47: Which pair of substances will likely undergo a single replacement reaction?
A) Na & BaCl2
B) Zn & BaCl2
C) Ca & BaCl2
D) K & BaCl2

- Answer: Use Activity Series Chart on reference table → D) K & BaCl2

FE3-48: What is the net ionic equation (N.I.E.) for the reaction between LiBr and AgNO3?

- Answer: N.I.E. = 1 Ag^{1+} (aq) + 1 Br^{1-} (aq) → 1 AgBr (s)

FE3-49: How many molecules are contained in 55.0 g of H2SO4?

- Answer: 3.38 x 10^23 molecules H2SO4

FE3-50: How many grams of KCl are necessary to prepare 1.50 liters of a 0.500 M solution of KCl?

- Answer: 55.9 g KCl