

Final Exam Twitter Review #4

FE4-1: Which describes current atomic theory?

- A) e- circle orbits around + nucleus
- B) e- in cloud around + nucleus
- C) mass determined by n0

- Answer: B) Atoms have e- in a cloud around (+) nucleus

FE4-2: What is the nuclear composition of uranium-235?

- A) 92 e- ; 143 p+
- B) 92 p+ ; 143 e-
- C) 143 p+ ; 92 n0
- D) 92 p+ ; 143 n0

- Answer: D) 92 p+ ; 143 n0

FE4-3: What is true about protons and electrons in any neutral atom?

- Answer: p+ & e- are equal

FE4-4: What is the name of the compound Co_3N_2 ?

- Answer: Cobalt (II) Nitride

FE4-5: What is the correct chemical formula for dinitrogen pentabromide?

- Answer: N_2Br_5

FE4-6: What is the name of H_3PO_4 (aq)?

- Answer: Phosphoric Acid

FE4-7: What is the chemical formula for barium dichromate?

- Answer: BaCr_2O_7

FE4-8: What is the most effective method of increasing the solubility of most solid solutes?

- Answer: Increasing the temperature

FE4-9: What happens to the pressure of a constant mass of gas at constant temperature when the volume is doubled?

- Answer: Boyle's Law $\rightarrow P_1V_1 = P_2V_2 \rightarrow$ Inverse \rightarrow Pressure is reduced by half

FE4-10: The total pressure of N₂, O₂, & CO₂ is 30 atm. If the partial pressure of N₂ is 4 atm and O₂ is 6 atm, what is the pressure of CO₂?

- Answer: Dalton's Law of Partial Pressure → $P_{\text{CO}_2} = 20 \text{ atm}$

FE4-11: What is the pressure (atm) exerted by a 0.100-mol sample of oxygen in a 2.00-L container at 273°C?

- Answer: Ideal Gas Law → $PV=nRT$ → $P=2.24 \text{ atm}$

FE4-12: What bond is associated with:

- 1) High melting points
- 2) Solutions conduct electricity
- 3) Crystalline solids at room temp

- Answer: Ionic Bonds

FE4-13: If the volume of an 18.5-g piece of metal is 2.35 cm³, what is the identity of the metal?

- Answer: $D=\text{mass}/\text{volume}$ → Iron

FE4-14: Ionic bonds ___ valence e⁻ ; Covalent bonds ___ valence e⁻ ; Metallic bonds consist of mobile e⁻ forming a "_____".

- Answer: Transfer ; Share ; "Sea of Electrons"

FE4-15: Which pair of elements would most likely bond to form a covalently bonded compound?

- A) Na & F
- B) Ba & Cl
- C) P & O
- D) Mg & S

- Answer: C) P & O

FE4-16: Based on VSEPR theory, what is the molecular geometry of a molecule of BF₃?

- Answer: MG = Trigonal Planar

FE4-17: A compound has the chemical formula X₂O. Which element would "X" most likely represent?

- A) Fe
- B) Zn
- C) Ag
- D) Sn

- Answer: C) Ag

FE4-18: Write the electron configuration (longhand) of a neutral atom of cobalt.

- Answer: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$

FE4-19: How many electrons does a neutral atom of manganese have in its outermost level (shell)?

- Answer: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5 \rightarrow 2$ valence e-

FE4-20: Which correctly lists atoms from smallest to largest atomic radii?

A) I, Br, Cl, F

B) F, I, Br, Cl

C) Si, P, S, Cl

D) Cl, S, P, Si

- Answer: D) Cl, S, P, Si

FE4-21: Explain why chlorine has a smaller atomic radius than phosphorus. Be very specific.

- Answer: Cl has a greater effective nuclear charge (Z_{eff}) that allows protons to pull in e- (thus energy levels) closer to nucleus

FE4-22: Which group of the periodic table has the greatest electronegativities?

- Answer: Halogens

FE4-23: How many moles are in 59.6 grams of barium sulfate?

- Answer: 0.256 mol BaSO_4

FE4-24: What is the volume of 2.00 moles of hydrogen gas at STP?

- Answer: 44.8 L $\text{H}_2(\text{g})$

FE4-25: If a sample of magnesium has a mass of 60. grams, how many moles of magnesium does the sample contain?

- Answer: 2.5 mol Mg

FE4-26: What is the molarity of a solution containing 20.0 grams of sodium hydroxide dissolved in 1.00 L of solution?

- Answer: $M = \text{mol/L} \rightarrow 0.500 \text{ M NaOH}$

FE4-27: A compound has an empirical formula of CH_2O and a molecular mass of 180 g. What is the compound's molecular formula?

- Answer: $\text{MF} = \text{mmMF} / \text{mmEF} \rightarrow \text{MF} = \text{C}_6\text{H}_{12}\text{O}_6$

FE4-28: What is the percent by mass of iron in the compound iron (III) oxide?

- Answer: % Comp \rightarrow $\text{Fe}_2\text{O}_3 \rightarrow \text{Fe} = 69.8\%$

FE4-29: How many moles of hydrogen gas are generated when 4.0 moles of sodium react with excess water? $2 \text{Na} + 2 \text{H}_2\text{O} \rightarrow 2 \text{NaOH} + 1 \text{H}_2$

- Answer: LR/ER \rightarrow 2.0 mol $\text{H}_2(\text{g})$

FE4-30: How many grams of calcium are required to produce 60.0 grams of calcium phosphate? $__ \text{Ca} + __ \text{H}_3\text{PO}_4 \rightarrow __ \text{Ca}_3(\text{PO}_4)_2 + __ \text{H}_2$

- Answer: 3,2,1,3 \rightarrow 23.3 g Ca

FE4-31: What mass of H_2O is required to yield 22.4 L of O_2 at STP? $__ \text{H}_2\text{O} \rightarrow __ \text{H}_2 + __ \text{O}_2$

- Answer: 2,2,1 \rightarrow 36.0 g H_2O

FE4-32: How many grams of $\text{Mg}_3(\text{PO}_4)_2$ should be produced if 5.40 grams of Mg react with excess H_3PO_4 ? $__ \text{Mg} + __ \text{H}_3\text{PO}_4 \rightarrow __ \text{Mg}_3(\text{PO}_4)_2 + __ \text{H}_2$

- Answer: 3,2,1,3 \rightarrow 19.5 grams $\text{Mg}_3(\text{PO}_4)_2$

FE4-33: Which color of light would a hydrogen atom emit when an electron changes from $n=5$ to $n=2$? (Refer to Bohr Model of Hydrogen atom)

- Answer: Blue

FE4-34: Which indicates light emitted by hydrogen atom with wavelength of 103nm?

A) $n=2$ to $n=1$

B) $n=3$ to $n=1$

C) $n=4$ to $n=2$

D) $n=5$ to $n=2$

- Answer: B) $n=3$ to $n=1$

FE4-35: 6.00 grams of gold was heated from 20.0°C to 22.0°C . How much heat was applied to the gold?

- Answer: $q = mC_p\Delta T \rightarrow q = 1.55 \text{ J}$

FE4-36: How many grams of ice will melt at 0°C if the ice absorbs 420. J of energy?

- Answer: $q = m\Delta H_f \rightarrow m = 1.26 \text{ g}$

FE4-37: Which particle (alpha, beta, gamma) is the weakest in penetrating power?

- Answer: Alpha Particle

FE4-38: When a heavier nucleus splits to produce a lighter, more stable nuclei, it has gone through a nuclear ____ process.

- Answer: Fission

FE4-39: What will complete the following equation: $U-238 \rightarrow Th-234 + _? _$

- Answer: Alpha Particle (4_2He)

FE4-40:

A) Will the reaction occur? : $1 F_2 + 2 NaCl \rightarrow 2 NaF + 1 Cl_2$

B) Explain why or why not.

- Answer: A) Yes, will react B) F is above Cl on activity series chart

FE4-41: Predict the product(s) of $K + H_2O \rightarrow ?$

- Answer: Single Replacement $\rightarrow KOH + H_2$

FE4-42: When Na_2O reacts with H_2O , what is produced?

- Answer: Synthesis $\rightarrow NaOH$

FE4-43: What coefficients are required to balance the equation: $_Fe_2O_3 + _CO \rightarrow _Fe + _CO_2$

- Answer: 1,3,2,3

FE4-44: In the following reaction, why is ammonia (NH_3) considered a base? $NH_3(aq) + HCl(aq) \rightarrow NH_4^+(aq) + Cl^-(aq)$

- Answer: Bronsted-Lowry Base $\rightarrow NH_3$ accepts a proton (H^+)

FE4-45: Phenolphthalein is an indicator that turns pink in a basic solution. Which solution would turn pink?

A) $NaOH$

B) HCl

C) H_2O

D) $NaCl$

- Answer: A) $NaOH$

FE4-46: What is the pH of a solution of KOH with a hydroxide concentration of $[OH^-] = 1.0 \times 10^{-4} M$?

- Answer: $[H^+][OH^-] = 1.0 \times 10^{-14} M \rightarrow pH = 10^{-pH} \rightarrow pH=10$

FE4-47: In a titration experiment, if 30.0mL of HCl soln reacts with 24.6mL of a 0.500M NaOH soln, what is concentration of the HCl soln?

- Answer: $M_a V_a = M_b V_b \rightarrow M_a = 0.410 \text{ M HCl}$