THIS REVIEW BELONGS TO Hansen P#_____

3rd QUARTER EXAM REVIEW

1. What is the density of a piece of unknown metal that has a mass of 25.7 g and a volume of 4.3 ml? (Record answers in proper significant figures)

Density = mass / volume $D = \frac{25.7\text{g}}{4.3\text{ml}}$ D= g/ml

2. Describe the safest procedure for combining acid and water.

Add Acid slowly to Water while gently stirring. (AEW)

3. **LABEL THE FOLLOWING**

Ho- Homogeneous Mixture **He**- Heterogeneous Mixture **E**- Element **C**- Compound

HO Koolaid
E Silver
C Sugar

C Water (pure) H_2O
HO Tap water (minerals)
HE Oil and water

C Hydrochloric Acid (HCl)
E Gold
C Salt (NaCl)

4. **LABEL THE FOLLOWING**

(REMEMBER a Change is something that happens, while a Property is the ABILITY for the change to happen. Chemical changes produce new substances with different chemical formulas, while a physical change produces a new form of the same substance)

PC- Physical Change **CC**- Chemical change

CC Oxygen burning in the atmosphere
CC Rotting
PC Condensation
CC Sodium reacts with chlorine

PC Water evaporating
CC Decomposing
PC Boiling
CC Rusting

PP- Physical property **CP**- Chemical Property

CP The ability to rust
PP Ductility
CP ability to oxidize

PP Density
CP Flammability
PP Malleability

PP Color
PP Boiling pt
CP Combustible

5. How many protons, neutrons and electrons are in the following neutral atoms

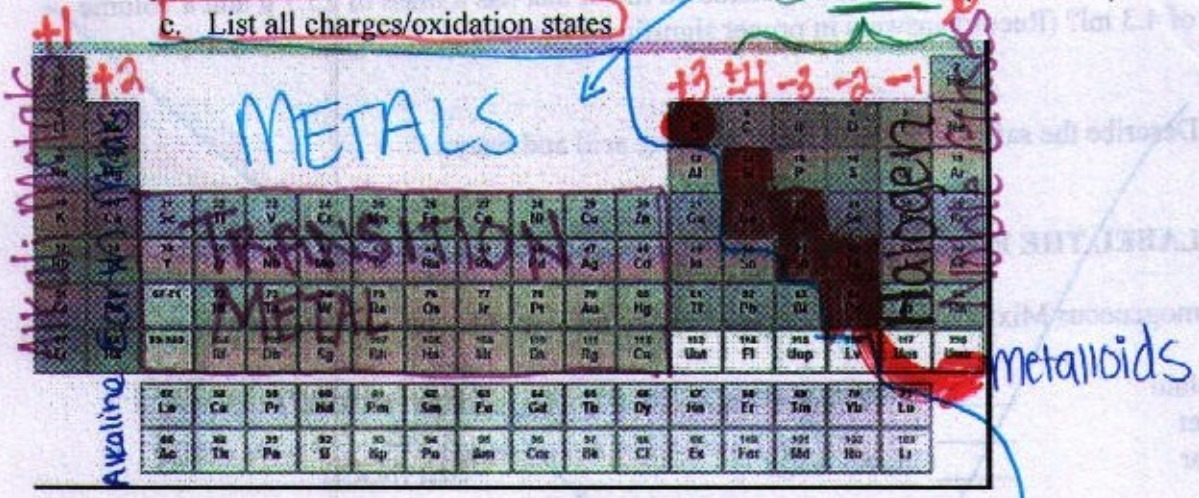
24 Mg magnesium 12	P=12 E=12 N=24-12=12

27 Al aluminum 13	P=13 E=13 N=27-13=14

11 B boron 5	P=5 E=5 N=11-5=6

6. Label the following groups on the periodic table

a. Alkali metals- Most reactive metals
b. Noble Gases- Least reactive group
c. Halogens- Most reactive nonmetals
d. Transition metals
e. List all charges/oxidation states
f. Alkaline Earth Metals
g. Metalloids
h. Metals (which side)
i. Nonmetals (which side)



7. **FILL IN THE BLANKS USING THE WORD BANK**

~~Properties~~	~~Characteristics~~	Protons	~~Anions~~
~~Cations~~	~~Electrons~~	Isotopes	Shared
~~Valence Electrons~~	~~Octet Rule~~	~~Transferred~~	

Atoms tend to lose, gain or share electrons to gain a full set of valence electrons. To satisfy the octet rule an atom wishes to have 8 electrons in its outermost shell. Cations are positive ions. Anions are negative ions. Groups/families generally have similar properties and similar characteristics. In ionic compounds the electrons are transferred

8. **Name the following compounds: (Transition metals need Roman numerals)**

$FeCl_3$ Iron III chloride
$AlCl_3$ Aluminum chloride
BaF_2 Barium Fluoride
FeO Iron II oxide
CuO Copper II oxide
HCl Hydrochloric Acid
$CaCO_3$ Calcium carbonate
$BaSO_4$ Barium sulfate
AgS Silver sulfide
$Ca_3(PO_4)_2$ Calcium phosphate

9. Write the formula for the following

Iron III Oxide Fe_2O_3
Aluminum Bromide $AlBr_3$
Sodium sulfate Na_2SO_4
Strontium phosphide Sr_3P_2
Barium phosphate $Ba_3(PO_4)_2$
Lead IV nitrate $Pb(NO_3)_4$
Tin IV sulfide $Sn_2S_4 = SnS_2$
Magnesium carbonate $MgCO_3$

10. The molar mass is the mass of one mole of a substance. Find the molar mass of the following:

$BaSO_4$ 233 g/mole
FeO 71.8 g/mole
$Ca_3(PO_4)_2$ 310 g/mole

Ba 1(137) = 137
S 1(32) = 32
O 4(16) = 64
233

Fe 1(55.8) = 55.8
O 1(16.0) = 16
71.8

Ca 3(40) = 120
P 2(31) = 62
O 8(16) = 128

10. How many grams would you weigh out to find 2.4 moles of Magnesium phosphide?

$2.4 \text{ moles } Mg_3P_2 \mid \frac{134 \text{ g } Mg_3P_2}{1 \text{ mole } Mg_3P_2} = 321.6 \text{ g}$

320 g ← Sig Fig Answer

Mg 3(24) = 72
P 2(31) = 62
134

11. Which single replacement reaction would occur and why?

$K + HCl \rightarrow KCl + H_2$ or $H_2 + KCl \rightarrow HCl + K$

Yes! Rxn K is higher than "H" on the Activity series

No Rxn b/c H is lower than K on Activity Series

12. Balance the following equations and List reaction type

$1\ H_2 + 1\ Br_2 \rightarrow 2\ HBr$ Synthesis

$3\ C + 1\ Fe_2O_3 \rightarrow 2\ Fe + 3\ CO$ Single Replacement

$1\ SiO_2 + 4\ HF \rightarrow 1\ SiF_4 + 2\ H_2O$ Double Replacement

$2\ K + 2\ H_2O \rightarrow 2\ KOH + 1\ H_2$ Single Replacement

$1\ Pb(NO_3)_2 + 2\ NaI \rightarrow 2\ NaNO_3 + 1\ PbI_2$ Double Replacement

$2\ C_3H_6 + 9\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$ Combustion

$1\ MgCO_3 \rightarrow 1\ MgO + 1\ CO_2$ Decomposition

13. In the following reaction

$1\ MgCO_3 \rightarrow 1\ MgO + 1\ CO_2$

How many grams of magnesium oxide can be produced when 27.8 g of Magnesium Carbonate decomposes? (3 SF)

Coefficient Ratio

$27.8 \text{ g } MgCO_3 \times \frac{1 \text{ mol } MgCO_3}{84 \text{ g } MgCO_3} \times \frac{1 \text{ mol MgO}}{1 \text{ mol } MgCO_3} \times \frac{40 \text{ g MgO}}{1 \text{ mol MgO}} = 13.2380$

13.2 g MgO

Mg 1(24) = 24
C 1(12) = 12
O 3(16) = 48
84

Mg 1(24) = 24
O 1(16) = 16
40

14. In the following reaction

$1\ H_2 + 1\ Br_2 \rightarrow 2\ HBr$

If 29 moles of bromine with excess hydrogen, how many moles of Hydrobromic acid can be produced?

$29 \text{ moles } Br_2 \times \frac{2 \text{ mole HBr}}{1 \text{ mole } Br_2} = 58 \text{ moles HBr}$

15. In the following reaction

1 $Pb(NO_3)_2$ + 2 NaI → 2 $NaNO_3$ + 1 PbI_2

How many grams of lead II iodide can be produced from 9.9 moles of sodium iodide with excess lead II nitrate?

9.9 moles NaI * 1 mole PbI_2 / 2 moles NaI * 334.1 g PbI_2 / 1 mol PbI_2 = 1653.795 g

1700 g PbI_2 SF

207.2
126.9
334.1

16. In the following reaction

1 $Pb(NO_3)_2$ + 2 NaI → 2 $NaNO_3$ + 1 PbI_2

How many moles of lead II iodide can be produced from 9.9 grams of sodium iodide with excess lead II nitrate?

9.9 g NaI * 1 mol NaI / 149.9 g NaI * 1 mol PbI_2 / 2 mol NaI = 0.03302

0.033 moles PbI_2

Na 1(23) = 23
I 1(126.9) = 126.9
149.9

17. Balance the following Nuclear equation. What type of radiation is present?

$^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^{4}_{2}He$ Alpha

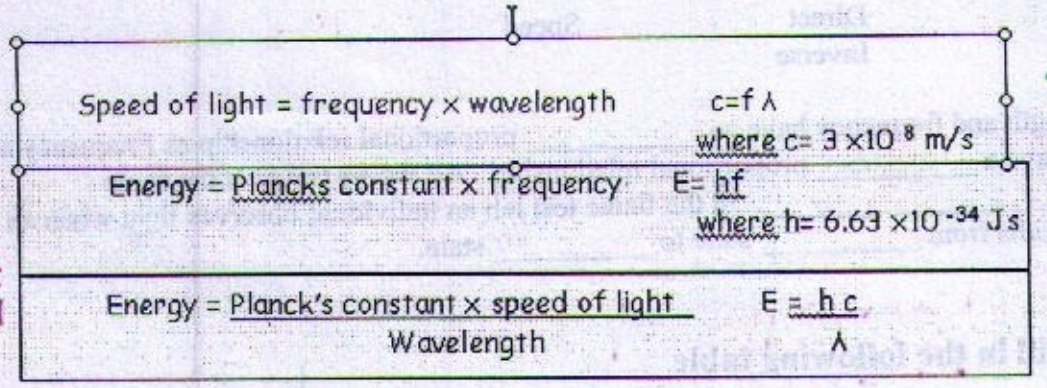
18. What is represented by the X in the equation below?

$^{40}_{17}Cl$ $X \rightarrow {}^{40}_{18}Ar + {}^{0}_{-1}e$

19. Describe the difference between a fusion and fission reaction

Fusion - occurs when nuclei of 2 atoms combine
1 "s" in Fusion = 1 product ☺
Fission - breaking apart of 1 atom into 2.
2 "ss" in Fission = 2 products ☺

20. Practice Calculations! SHOW ALL WORK!



W & F

E & F

E & W

Units

frequency - Hz, 1/sec, sec^{-1}

energy - J

wavelength - m

21. A photon of light has a wavelength of 3.20×10^5 m. Find…

a. the frequency of the radiation. (f, w)

$C = f(w)$

$3 \times 10^8 = 3.20 \times 10^5 (f)$

$f = 937.5$ or **938 Hz**

b. the energy of the photon.

$E = \frac{h \cdot c}{w}$ $\quad \frac{6.63 \times 10^{-34}(3 \times 10^8)}{3.20 \times 10^5} = 6.22 \times 10^{-31}$ J

22. Determine the frequency of light with a wavelength of 4.257×10^{-7} m. (Typo! Opps!)

$C = f \cdot w$

$3 \times 10^8 = f(4.257 \times 10^{-7})$

$f = 7.047 \times 10^{14}$ Hz

23. What is the energy of a quantum of light that has a frequency of 4.31×10^{14} Hz

$E = h \cdot f$

$E = 6.63 \times 10^{-34}(4.31 \times 10^{14})$

$E = 2.86 \times 10^{-19}$ J

24. Fill in the blanks

Excited	~~Direct~~	~~Speed~~
Ground	Inverse	

Wavelength and frequency have an inverse proportional relationship as Frequency and energy have a direct proportional relationship. All waves travel at the same speed. In the flame test lab an individual observes light when an electron falls from excited state to ground state.

25. Fill in the following table

Element	Electron Configuration	Orbital Notation	Noble Gas Config
Sodium	$1s^2 2s^2 2p^6 3s^1$	3s ↑ 2p ↑↓ ↑↓ ↑↓ 2s ↑↓ 1s ↑↓	[Ne] $3s^1$
Ca	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$	4s ↑↓ 3p ↑↓ ↑↓ ↑↓ 3s ↑↓ 2p ↑↓ ↑↓ ↑↓ 2s ↑↓ 1s ↑↓	[Ar] $4s^2$
Sulfur	$1s^2 2s^2 2p^6 3s^2 3p^4$	3p ↑↓ ↑ ↑ 3s ↑↓ 2p ↑↓ ↑↓ ↑↓ 2s ↑↓ 1s ↑↓	[Ne] $3s^2 3p^4$
Br	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10}$ $4p^5$	4p ↑↓ ↑↓ ↑ 3d ↑↓ ↑↓ ↑↓ ↑↓ ↑↓ 4s ↑↓ 3p ↑↓ ↑↓ ↑↓ 3s ↑↓ 2p ↑↓ ↑↓ ↑↓ 2s ↑↓ 1s ↑↓	[Ar] $4s^2 3d^{10} 4p^5$