

AG

KOL

Final Review

If you can answer these questions, you will do a superb job on the final! This final exam covers material from the 3rd and 4th quarter. ANSWER ON A SEPARATE SHEET OF PAPER!!

Matter

1. How are the atoms arranged in a solid, liquid, and gas?

○○○○○ → S, ○○○○ → L, ○○○○ → G / higher temp = faster

2. State two facts the kinetic theory tells us.

1. All matter composed of atoms 2. Particles in constant motion

3. What is the difference between a physical and chemical property? Give 1

example of each. Physical is matter that can be observed but not changing identity i.e., color, volume, size / Chemical → new product formed

4. What is the difference between a physical and chemical change? Give 1 example of each.

Physical → reversible (chemical is not) P → freezing water

5. What does the Law of Conservation of Mass tell us? C → burning wood

Mass is never created nor destroyed

6. Know what the following properties mean.

Malleability - capable of being shaped - physical property

Oxidation - chemical property → substance w/ oxygen

Solubility - chemical property → process of dissolving

Buoyancy - ability to float physical property

7. Identify the change in state.

Liquid to a gas = evaporation

Solid to a liquid = melting

Solid to a gas = sublimation

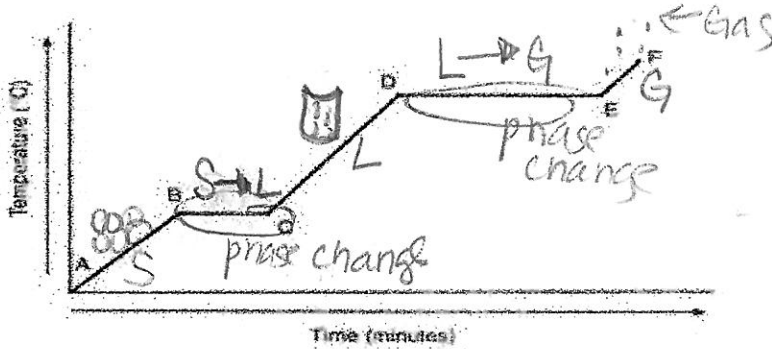
Gas to a liquid = condensation

P - shape or state
C - new substance(s) formed

ie. rust, smoke
properly observable during reaction

8. On the following heating curve of water, identify the following:

- solid, liquid, gas $A-C-E$
- 2 phase changes $(B-C)(D-E)$ $(A-B)(C-D)(E-F)$
- where there is a change in kinetic energy $(A-B)(C-D)(E-F)$
- where all the ice has completely melted $(E-F)$



9. Describe the difference between exothermic and endothermic. Give 1 example of each.

Exo-chemical reaction & heat Ex. burning wood / Endo-chemical reaction, heat absorbed

10. Describe the difference between a heterogeneous and homogeneous mixture. Give 1 example of each.

heter → mixture not blended physically see particles
Ex. veg. soup

11. Explain two differences between a pure substance and a mixture. Give 2 examples of each. P.S. → Same comp & properties Ex. elements/compounds

P.M. → Combo 2 or more P.S. & each keep properties. Ex. homo/heter.

12. If I am drinking Kool-Aid, what is the solute and solvent?

Solute - Koolaid (being dissolved)
Solvent - Water

Atomic Structure

1. What is the big idea of Dalton's, Rutherford's, Bohr's, Thomson's, Electron

Cloud's idea of the atom? D = solid sphere, O = indivisible, R = nucleus w/ protons, mass from nucleus, B = e- in orbit (fixed)

2. Define proton, electron, neutron, atomic mass, isotope, atomic number.

+ - no

3. Give 3 facts about the nucleus. made of protons neutrons, at center of atom, = most mass

4. Give 3 facts about electrons.

have - charge (-)
Outside nucleus (cloud)
involved in chemical bonding

T = electrons - charge e- stuck in place

• mass = p⁺ + n⁰
• isotope = same p⁺ different n⁰
• at. # = element # = # of p⁺

5. Know how to read the periodic table.

A. How many electrons, protons, neutrons does Chlorine have?

$E = 17$

B. What is the most common isotope of Chlorine?

avg. mass / closest

Cl^{35} mass

$P = 17$

$N = 35 - 17 = 18$ or 17/18

6. How many total atoms does the compound $CaCO_3$ have?



$= 4$ $1 + 1 + 3 = 5$

a. How many atoms are there of Oxygen in the above compound? 3

7. What is an isotope? How are isotopes similar to one another? Different?

Atoms of same element w/ different # neutrons ✓

8. What is the average atomic mass of the sample of isotopes of Carbon below?

most common there fore avgs. will be closest to (12)

8 atoms of C-11	88
15 atoms of C-12	180
7 atoms of C-13	91
<hr/>	
30 atoms total	

$\frac{8}{30} = 27\%$ $(.27 * 11) = 2.97$
 $\frac{15}{30} = 50\%$ $(.50 * 12) = 6.00$
 $\frac{7}{30} = 23\%$ $(.23 * 13) = 2.99$

11.94 amu

9. What is a period and a group on the periodic table?

period tells you row or energy level Group tells you group

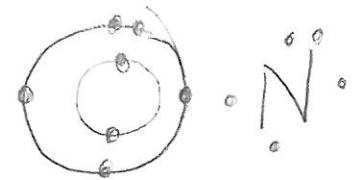
10. What is the highest energy level Potassium occupies? How many valence electrons? 4, 1 v.e.

of valence electrons

11. Look at Magnesium

- Total electrons = 12
- Total electrons in level 1 = 2
- Total electrons in level 2 = 8
- Total electrons in level 3 = 2
- How many valence electrons = 2

12. Draw the Bohr diagram and Lewis dot structure for Nitrogen.



13. Who generally "lends" electrons and who "borrows" electrons?

metals → lend
 nonmetals → borrows

14. Determine the ionic charge for Oxygen.

a. How many protons and electrons does a neutral atom of Oxygen have?

P = 8
E = 8

b. How many valence electrons does Oxygen have? 6

c. Is Oxygen a metal or nonmetal? NM

d. Will Oxygen lend or borrow electrons? borrow How many?

e. Put it all together!! Write the symbol with the charge!



$6 + 2 = 8$
- wants 2 to be "stable"
- 2 extra (-) sets to 8

Periodic Trends

1. Who is the "founder" of the periodic table? He arranged the periodic table according to what? How did Mosley arrange the periodic table?

Mendeleev = atomic mass Mosley = atomic number (P⁺)

2. List 2 elements with properties similar to Chlorine (Cl).

F Br

3. What is a "row" called on the periodic table? A column?

Period

Group (also family)

4. I'm in period 4, group 1, who am I?

K

5. List 5 characteristics (general properties) of metals.

Good conductors, solid at room temp, shiny, ductile, malleable

6. List 5 characteristics (general properties) of nonmetals.

Poor conductors, gas/liquid, brittle, dull, not malleable

7. Where are the metalloids found on the periodic table? What are they?

along stair step → Boron, Silicon, Ge, As, Sb, Te, Po

8. What are the family/group names for group 1, group 2, groups 3-12, group 17, group 18, and for the 2 separated rows on the bottom of the periodic table.

Group 1 - Alkaline Earth 2 - Earth 3-12 - Trans Group 17 - Halogens 18 - Noble Gases

9. Who is the most reactive family on the periodic table? Who is the only family that doesn't react? Who is the family known for their colored compounds?

Alkaline Earth, Noble Gases

10. List the following metals in order from most reactive to least reactive.

M → L
K, Mg, Au, Hg → K, Mg, Au, Hg

2 rows separate
- Lanthanides
- Actinides

11. List the following nonmetals in order from most reactive to least reactive.

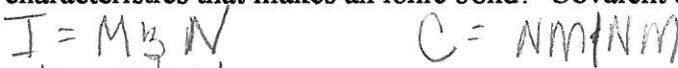
M → L
C, Cl, O, N

Cl, O, N, C

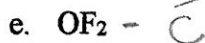
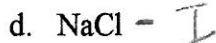
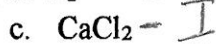
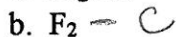
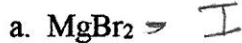
-1 -2 -3 +4 ✓

Bonding and Compounds

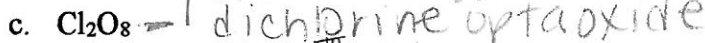
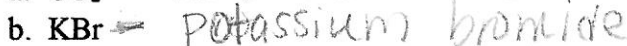
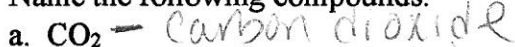
1. List two characteristics that makes an ionic bond? Covalent bond? Metallic bond?



2. Label the following as ionic or covalent.

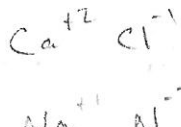
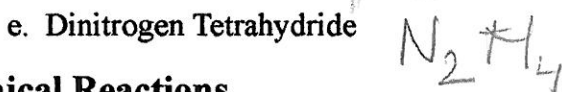
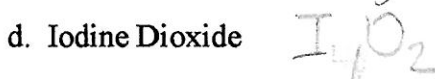
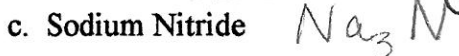
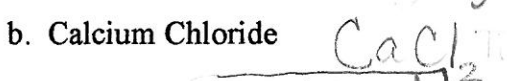
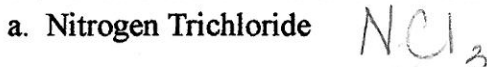


3. Name the following compounds.



transition metals (need?)
Roman numeral

4. Write formulas for the following compounds (If it's ionic you need charges first, then criss-cross them and write them as subscripts!!)



Chemical Reactions



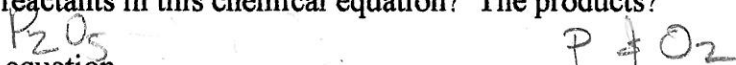
a. Who are the reactants in this chemical equation? The products?



b. Balance the equation.



a. Who are the reactants in this chemical equation? The products?



b. Balance the equation.

→ synthesis decomposition single-replace double-replace combustion
 (5 types)

3a. Name two pieces of evidence for having an exothermic and an endothermic reaction.
 Exo → Temp ↑ Endo Temp ↓

b. Give 2 examples of each type of chemical reaction.

heat produced, smoke/gas

surrounding/system

4. What is the difference between a nuclear reaction and a chemical reaction?

nuclear → nucleus chemical → electrons

5. Name the 3 types of nuclear radiation and describe the penetrating ability for each.

Alpha - Least (paper)

Beta - Faster than Alpha (foil)

Gamma - Fastest (concrete/lead)

6. Balance the following nuclear equations:



unstable nucleus - energy given off when nucleus splits

7. Explain what radioactivity means. Explain what a half-life is.

powerful/dangerous energy / amt of time it takes for 1/2 nucleus decay

8. The half-life of Element X is 20 years. How much of a 400 gram sample will be left after 80 years?

400g → 200g → 100g → 50g → 25g

(statistical average)

9. A radioactive element has a half-life of 10 minutes. If you start out with 100 g of the element, how much would be left after 30 minutes?

100g → 50g → 25g → 12.5g

12.5g

10. 200 g of Element Y decays to 50 g in 20 days. What is the half-life of Element Y?

200g → 100g → 50g

1/2 = 10 dys

11. Explain C-14 dating.

used to date plant/animals; 1/2 = 5,370 yrs, plants share

12. What is Einstein's formula? What does his theory of relativity tell us?

$E=mc^2$ (mass ↔ energy conversion)

13. What is the difference between fission and fusion? What does each reaction produce?

Fission → splitting nucleus smaller pieces

Fusion

14. Which reaction takes place in the sun?

FUSION

2 nuclei combine to form 1 large nucleus

theory: speed of light is constant regardless of observer

(special relativity 1905)

fission is division

(general relativity 1915)

- massive objects distort space-time - we call this gravity

Universe

We just did this chapter!! Look at your learning targets!!!!

