

Semester 1 Final Review

Stans

Wed 12/7 → Fri 12/9

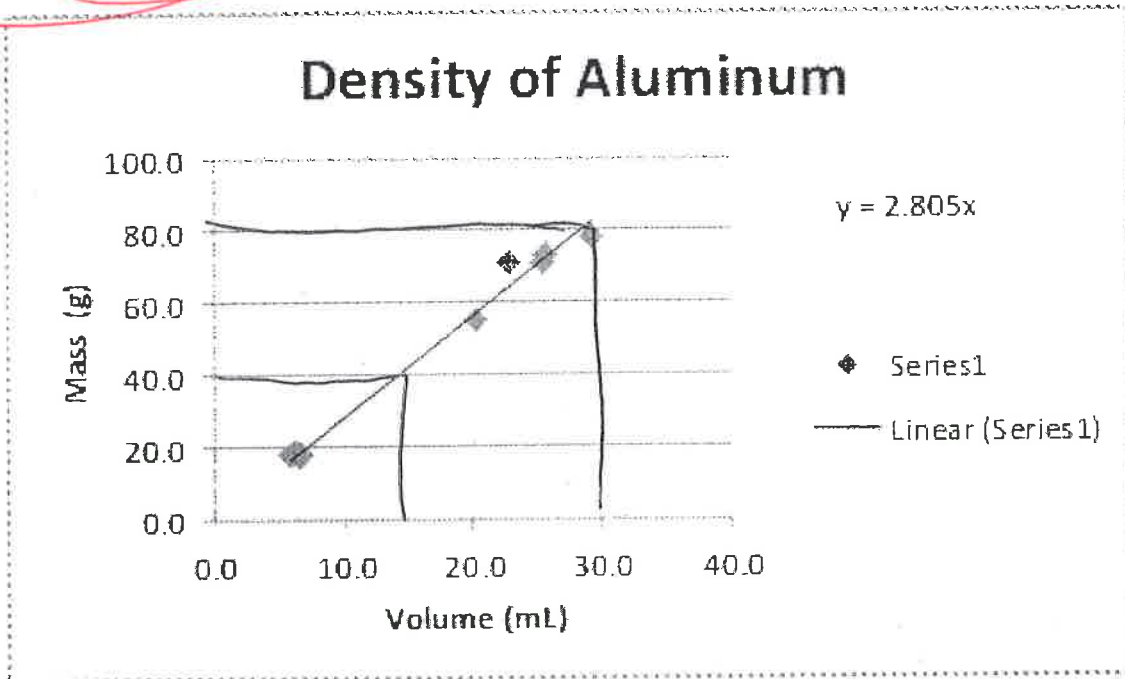
Key

Due Wed #1-11
Due Thurs #12-24
Due Fri Rest
#25

Density

Use the following for questions 1-5

Changing the volume of aluminum and measuring the mass determined the density of aluminum. The data collected was then plotted on the graph. Aluminum is a shiny, solid metal that has a fairly low density.



1. According to the figure above, how many grams of aluminum would be present if you had 30ml of Aluminum?

80grams

2. According to the figure, what volume of aluminum would be required to obtain 40 grams of aluminum?

~ 15 ml

3. According to the graph, what are the independent and dependent variables?

independent = x-axis volume

dependent = mass

4. Provide two examples of qualitative data from the ~~graph~~ paragraph.

shiny / solid > description

5. Provide two examples of quantitative data.

10ml
10g > numbers

(key)

Atomic Structure and Flame Test

In lab, a student conducted a flame test experiment. The students placed wooden splints in chemicals overnight and then placed the soaked splints in the flame for observation. Below are data table of their observations.

Table 1: Flame Color from Lab

Substance	Color
Ba	Yellow
Na	Orange
Cu	Blue-Green

Table 2: Accepted Wavelength of Flame Colors

Color	Wavelength
Orange	600nm
Blue-green	490nm
Red	650nm
Violet	410nm
Yellow	580nm
Orange-yellow	590nm

6. Sodium is an element that the student used. How many protons are in an atom of sodium.

Na 11 protons

7. One of sodium's isotope has a mass of 24amu (atomic mass units). Use your periodic table to determine the number of neutrons in this isotope of sodium.

$$24 - 11 = 13 \text{ Neutrons}$$

Atomic mass - # protons = Neutrons

8. According to table 1, what color of light is emitted by heating barium on a Bunsen burner.

Yellow

9. Explain how an atom emits color. (Where does it get energy from? Where does the energy go? How do we get light?)

Atom absorbs energy from fire and the electron jumps from its ground state to an excited state. When it returns from excited state it emits photon light.

(Key)

10. Another student tested an unknown solution. The solution produced a wavelength of ~~479~~nm. What element is the unknown?

~~479~~nm
410 - violet
490 = Blue-green so its copper

11. The color spectrum is ROYGBIV. Which has the most energy? Which has the least energy? Which has the largest wavelength? Which has the smallest Wavelength?

ROYGBIV
→ increasing energy
Red = least energy
Longest wavelength
violet - most energy
smallest wavelength

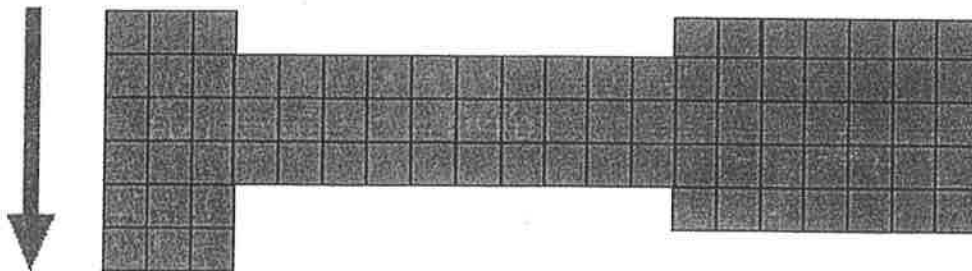
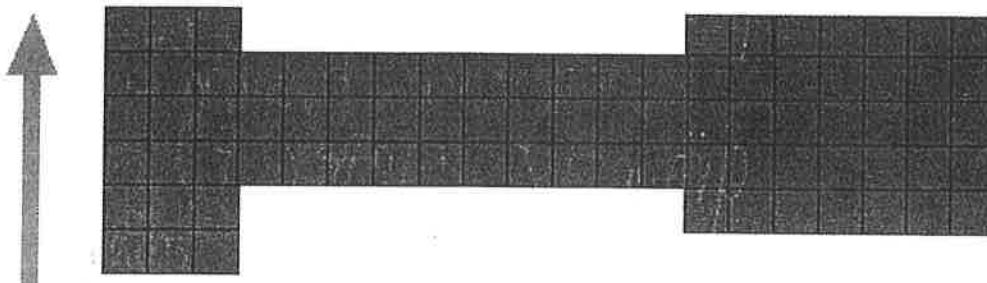
Periodic Table

The figure below shows arrows that represent different periodic properties. Each arrow points to the largest value.

12. Which Periodic trend is represented in the following:



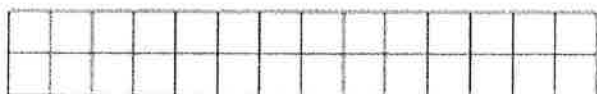
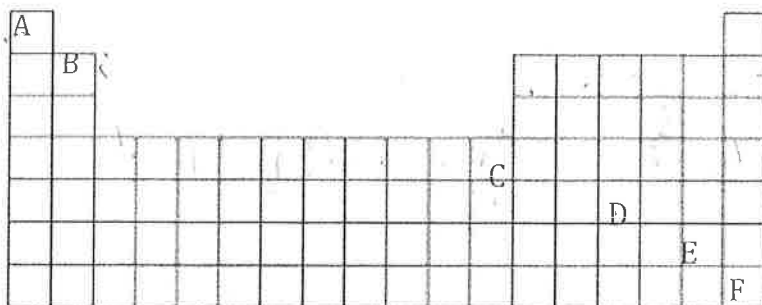
p. 172-173



Atomic Radius

Key

Use the diagram below to answer questions 13-17:



13. Which elements have similar properties?

same group = same properties

14. Which has the lewis dot structure:



D

15. Where are the noble gases?

group 18 (letter F)

16. Which has the most valence electrons?

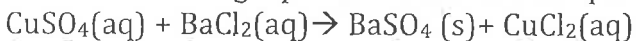
F

17. Which of the following has the following electron configuration: $1s^2 2s^2$?

B

Chemical Reactions

Use the following equation to answer the questions 18- 24 below:



18. Which coefficient correctly balances the equation?

- a. 1,1,1,1
- b. 2,1,1,1
- c. 2,1,2,1
- d. 1,3,1,2

its already balanced

19. What type of reaction does this represent?

Double replacement

20. What are the reactants in the above equation?

$\text{CuSO}_4 + \text{BaCl}_2$ (the starting material)

21. What are the products in the above equation?

$\text{BaSO}_4 + \text{CuCl}_2$ (the final materials)

22. When this reaction occurred a cloudy solid forms. What is this cloudy solid called? What is the chemical name of that solid?

Precipitate / Barium sulfate

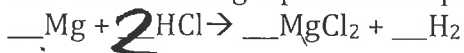
23. What is the cation in the solid?

Ba^{+2}

24. What is the anion in the solid?

SO_4^{-2}

Start Fri
Use the following equation for questions # 25-26

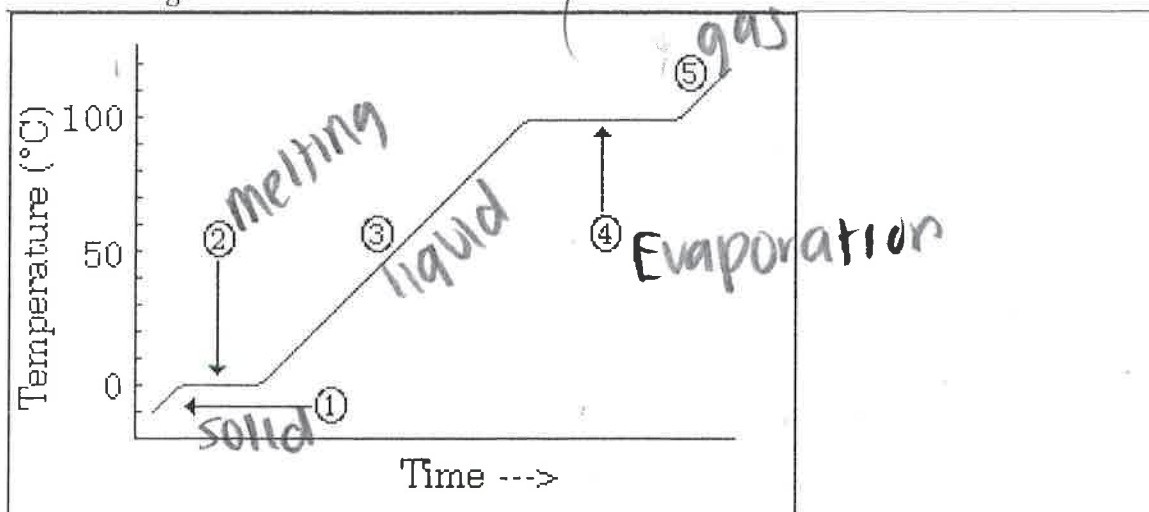


25. Balance the above equation.

26. What type of reaction is represented above?

single replacement

Phase Change of Water



27. Label each number of the diagram above.

28. Explain what is occurring in this graph in paragraph form.

substance is gaining energy and going from solid to liquid to gas

29. Why does the temperature remain constant at number 2 and number 4?

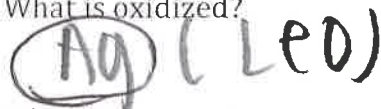
energy is being used to break intermolecular forces instead of heating it up

Redox Reactions

Use the following to answer questions



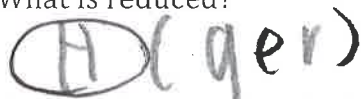
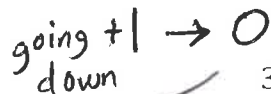
30. What is oxidized?



Lose Electrons Oxidation

electrons on right
charge goes up

31. What is reduced?



Gain Electrons Reduction

electrons on the left -
charge goes down.

32. Gaining electrons is called

reduction.

(Key)

Acids/Bases

33. Predict the products for the neutralization reaction: $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

34. What type of reaction is a neutralization reaction? $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

Double replacement

35. What is the pH of .2M HCl?

$\text{pH} = -\log(\text{H}^+)$

$\text{pH} = -\log(.2) = .699$

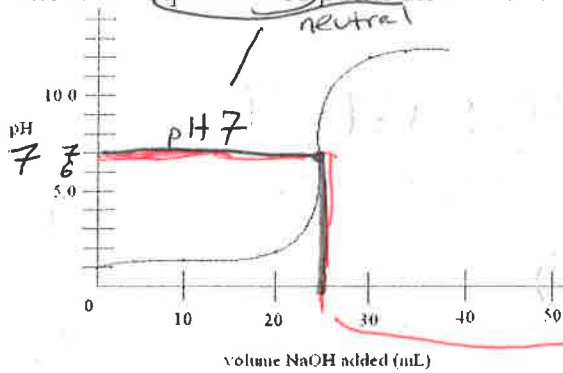
36. What is the pH of .2M NaOH?

$\text{pH} = 14 + \log(\text{OH}^-)$

$\text{pH} = 14 + \log(.2)$

13.30

37. Label the equivalence point on the following graph:



when 25 mL of NaOH has been added

38. Fill in the tchart with the following words: H^+ , OH^- , Sour, Slippery, $\text{pH}=8$, $\text{pH}=2$, NaOH, HCl, KOH, HNO_3

Acid	Base
H^+	OH^-
SOUR	SLIPPERY
$\text{pH}=2$	$\text{pH}=8$
HCl	NaOH
HNO_3	KOH

(Ken)

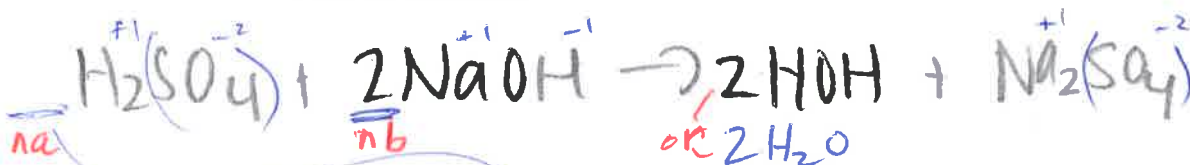
39. True or False As the concentration of H^+ increases the concentration of OH^- increases.

(if it is false correct the statement below)

change to decreases

40. 1.5L of Sulfuric acid (H_2SO_4) is neutralized with 2M sodium hydroxide, NaOH. The sample required .2L of NaOH to neutralize it.

a. Write the balanced chemical equation.



b. What is the molarity of Sulfuric acid?

$$n_b V_a M_a = n_a V_b M_b$$

$$(2)(M_a)(1.5) = (1)(.2)(2)$$

c. What is the pH of the sulfuric acid?

$$pH = -\log (H^+)$$

$$pH = -\log (.133)$$

$$.876$$

Very acidic.

$$3M_a = .4$$

$$M_a = .133M$$

Use H+ equation