Do Now

- Mass your final samples and begin your calculations.
- We will begin the review in 10 minutes.

Review

- Grab a whiteboard.
- Write number of the problems that you would like to see solved the most.
- Have your notebook and calculator ready.

Numbers

- Mine: 2, 5, 10, 11, 17, 19, 20, 23, 24, 27, 33, 36, 37, 39, 40, 44, 45
- Yours: 43, 41, 26, 30

41) The specific heat capacity of lead is 0.13 J/(gx°C). How much heat (in J) is required to raise the temperature of 15 g of lead from 22°C to 37°C?

$q = ? = 29.25\ J$

=

$c = 0.13\ J/g \cdot °C$

x

$m = 15\ g$

x

$\Delta T = T_f - T_i\ °C = 37 - 22 = 15°$

43) How many kJ of heat are released when 15.75 g of Ba (s) reacts completely with oxygen to form BaO (s)?

$2Ba(s) + O_2(g) \rightarrow 2BaO(s) + 1107\ kJ$

$$\frac{15.75\ g\ Ba}{1} \times \frac{1\ mol\ Ba}{137.3\ g\ Ba} \times \frac{1107\ kJ}{2\ mol\ Ba}$$

$$63.63\ kJ$$

Lead(II) nitrate and potassium bromide react in a double replacement reaction. Write the:

- Balanced chemical equation (with state symbols);
- Complete ionic equation; and
- Net ionic equation.

Examine the net ionic equation, and identify the precipitate:

$$Pb(NO_3)_{2(aq)} + 2KBr_{(aq)} \rightarrow$$

$$PbBr_{2(s)} + 2KNO_{3(aq)}$$

Answer Sheets

- Please fill out the answer sheet that you will use for the final tomorrow.
- Make sure that your student ID number is bubbled in correctly.
- I can look it up if you don't know it.

Book Reminder!!!

Please bring your text book to the final.

Obligations will be written at the end of the day.

Liquid mercury has a density of 13.6 g/cm^3. An object with a mass of 9.83 g is placed in the mercury. The object will sink if it has a volume of less than: (1 point)

- 0.723 cm^3
- 1.38 cm^3
- 7.48 cm^3
- 134 cm^3

2

Thallium has two isotopes, thallium-203 and thallium-205. Thallium's atomic number is 81 and its atomic mass is 204.38 amu. Which statement about the thallium isotopes is true? (1 point)

- ◯ There is more thallium-203 in nature.
- ◯ Atoms of both isotopes have 81 protons.
- ◯ Thallium-205 atoms have fewer neutrons.
- ◯ The most common atom of thallium has a mass of 204.38 amu.

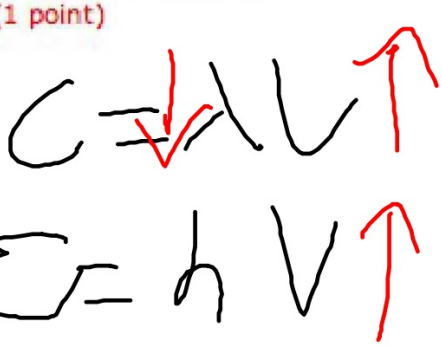
[Ne] $3s^2 3p^3$ is the electron configuration of a(n) atom of: (1 point)

- B
- N
- P
- Cl

10

The energy of a photon of light is dir proportional to its frequency and inv proportional to its wavelength. (1 point)

- directly, directly
- inversely, inversely
- inversely, directly
- directly, inversely
- indirectly, not



Identify **ALL** correctly written name/formula pairs. (1 point)

- [ ] Copper(I) nitrate, $Cu(NO_3)_2$
- [ ] Barium hydroxide, $Ba(OH)_2$
- [ ] Sulfur dichloride, SCl_2
- [ ] Lead oxide, PbO
- [ ] Dichlorine heptoxide, Cl_2O_7

17

Select **ALL** the polar molecules. Use Lewis structures to make your determination. (1 point)

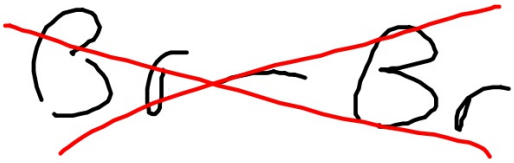
- ☐ Br_2
- ☐ NH_3
- ☐ CCl_4
- ☐ CH_3Cl

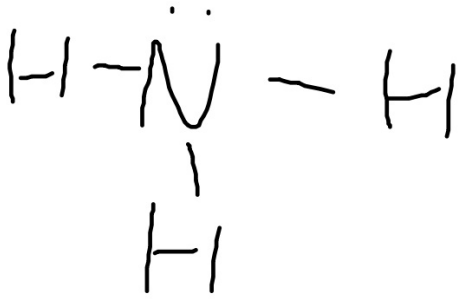
19

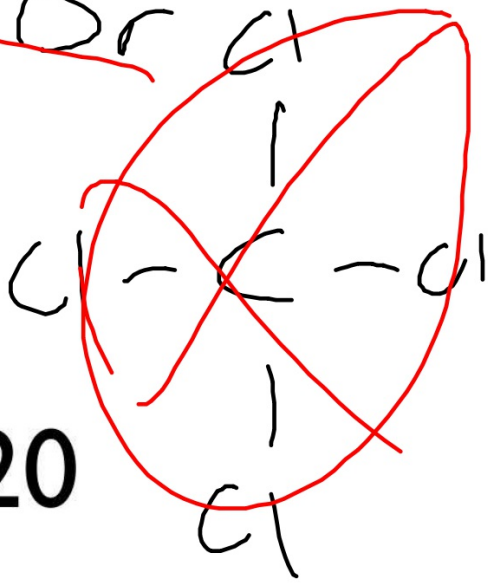
Use the "Like Dissolves Like" principle to identify **ALL** of the following compounds that will dissolve in water. (1 point)

- [ ] Br_2
- [ ] NH_3
- [ ] CCl_4
- [ ] CH_3Cl

Water is polar







20

What is the empirical formula for a compound that is 36.1% Ca and 63.9% Cl? (1 point)

- ○ CaCl
- ○ Ca_2Cl
- ○ $CaCl_2$
- ○ Ca_2Cl_2
- ○ Not enough information is provided

$36.1\,g\,Ca = 0.9\,mol$

$63.9\,g\,Cl = 1.8\,mol$

A compound contains 40.0% C, 6.71% H, and 53.29% O by mass. The molecular weight of the compound is 60.05 amu. The molecular formula of this compound is _____. (1 point)

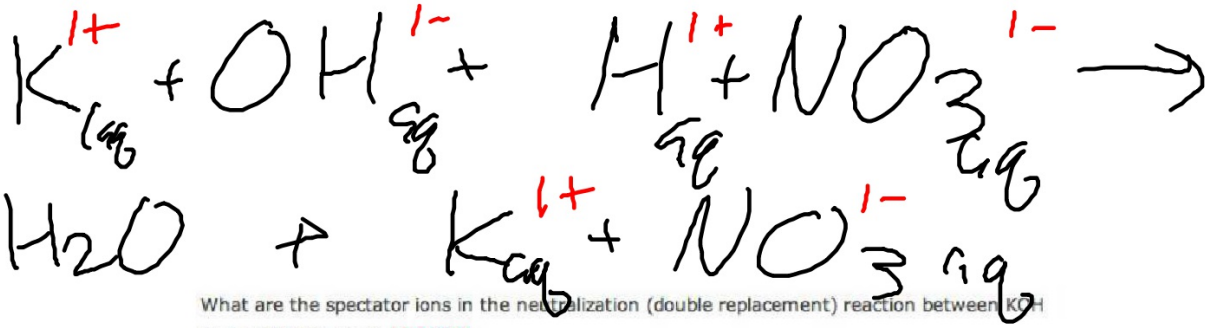
- $C_2H_4O_2$
- CH_2O
- $C_2H_3O_4$
- $C_2H_2O_4$

40g C = 3.3 mol

6.71g H 6.6 mol

53.29g O = 3.3 mol

C H_2O = 30g/mol



What are the spectator ions in the neutralization (double replacement) reaction between KOH (aq) and HNO_3 (aq)? (1 point)

- K^+ and H^+
- H^+ and OH^-
- K^+ and NO_3^-
- H^+ and NO_3^-

A 36.4 L volume of methane gas is heated from 25°C to 88°C at constant pressure. What is the final volume of the gas? (1 point)

- 128.1 L
- 30.0 L
- 44.1 L
- 80.5 L

An aqueous ethanol solution (400 mL) was diluted to 4.00 L, giving a concentration of 0.0400 M. The concentration of the original solution was _____ M. (1 point)

- 0.400
- 0.200
- 4.00
- 2.00

How many milliliters of 1.50M HNO_3 contain enough nitric acid to dissolve an old copper penny with a mass of 3.94 g?

$3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$

(1 point)

- 1.10 x 10^2 mL
- 1.10 x 10^{-4} mL
- ~~1.55 x 10^1 mL~~
- ~~1.55 x 10^{-5} mL~~

$$\frac{3.94\,g\,Cu}{1} \times \frac{1\,mol\,Cu}{63.5\,g\,Cu} \times \frac{8\,mol\,HNO_3}{3\,mol\,Cu} = 0.165\,mol\,HNO_3$$

$$M = \frac{mol}{V} \Rightarrow V = \frac{mol}{M} = 0.110\,L$$

A 17.5 mL sample of an acetic acid ($HC_2H_3O_2$) solution required 29.6 mL of 0.250 M NaOH for neutralization during a titration. The concentration of acetic acid was _____ M. (1 point)

- 0.15
- 0.42
- 6.8
- 0.21

$M = \frac{mol}{V} \Rightarrow mol = MV$

$NaOH: 0.25\,M \cdot 0.0296\,L = 0.0074$

$H^+ : \frac{mol}{V} = M \Rightarrow \frac{0.0074\,mol}{0.0175\,L} =$

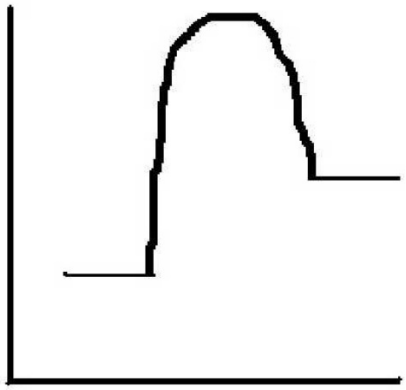
39

Which of the following would require the largest volume of 0.100 M sodium hydroxide solution for neutralization? (1 point)

- 10.0 mL of 0.0500 M H_3PO_4
- 20.0 mL of 0.0500 M HNO_3
- 5.0 mL of 0.0100 M H_2SO_4
- 15.0 mL of 0.0500 M HBr

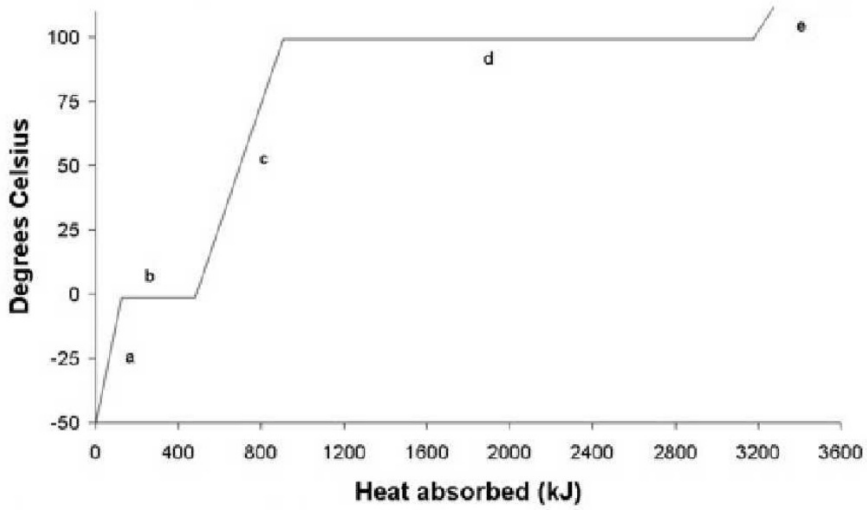
40

Examine the enthalpy diagram below. Select **ALL** of the true statements. (1 point)



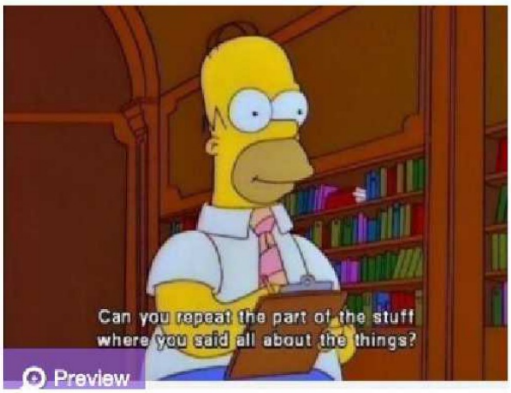
- [ ] Energy is released during the reaction.
- [ ] The reaction is endothermic.
- [ ] Adding a catalyst would decrease the energy difference between the reactants and products.

44



- [ ] A phase change is occuring in region "a"
- [ ] The energy added in region "d" is the molar heat of vaporization.
- [ ] Temperature is constant in region "b"

45



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