

Final Review 1: Final Analysis (Percent), % Error, and Matter

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Boiling point of N_2	Formula of ethanol	Melting point sucrose	Formula of sulfate	Melting point sodium chloride
$196^\circ C$	CH_3CH_2OH	$86^\circ C$	SO_4^{2-}	$801^\circ C$

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$$D = \frac{m}{V}$$

$$D = \frac{25.0g}{24.9cm^3} = 1.0 \frac{g}{cm^3}$$

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$$D = \frac{m}{V}$$

$$V = \frac{m}{D} = \frac{2.532g}{2.00cm^3} = 1.266cm^3$$

Final Review 1: Final Analysis (Percent), % Error, and Matter

$$67 \times 5.5 = 368.5 \text{ min.}$$

$$368.5 \text{ min.} \times \frac{1hr}{60min} = 6.14 \text{ hrs}$$

Exam Review 2: Atomic Theory

1. Identify the scientists who made the following discoveries

- Bohr suggested that electrons exist in discrete energy levels
- Rutherford atoms contain a dense, positive nucleus; gold-foil experiment
- Schrodinger responsible for the current model of the atom

2. Sketch the atomic model for the following scientists

Bohr	Schrodinger	Earliest model	Rutherford

3. Complete the following table

Atom or Ion	Average atomic mass	Mass Number	Atomic Number	Number of protons	Number of electrons	Number of neutrons
F	19.00	19	9	9	9	10
Mn	54.94	55	25	25	25	30
P^{3-}	30.97	31	15	15	18	16
^{24}Mg	24.31	24	12	12	12	12
Be^{2+}	9.012	9	4	4	2	5

3. Write the isotope symbol, (example: $^{238}_{92}U$) including atomic number and mass number for the following isotopes

Carbon-14	Chromium-53	Nickel 53	Zincium 92
$^{14}_6C$	$^{53}_{24}Cr$	$^{53}_{28}Ni$	$^{92}_{40}Zr$

Rubor model of Hydrogen - Give the energy transition (5 to 3) and the color of visible light emitted.

Energy Transition	Visible light color	Light wavelength
5 → 2	Blue	434 nm
3 → 2	Red	656 nm
6 → 2	Violet	410 nm

Electromagnetic spectrum

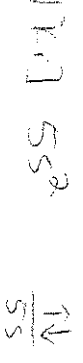
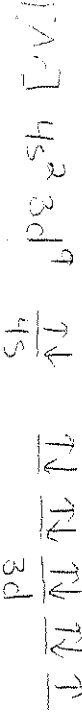
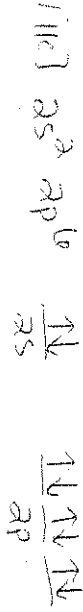
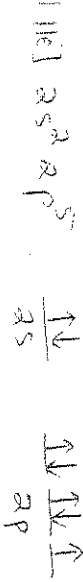
What is the range of wavelengths for green light
 $5.7 \times 10^{-7} \text{ m}$

Infrared - What types of waves have energy just less than that of visible light?

Gamma - What types of electromagnetic energy has the shortest wavelength?

Violet - Does violet light or red light have the greater frequency?

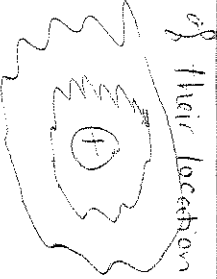
Give the abbreviated electron configuration and orbital diagram for each of the following.



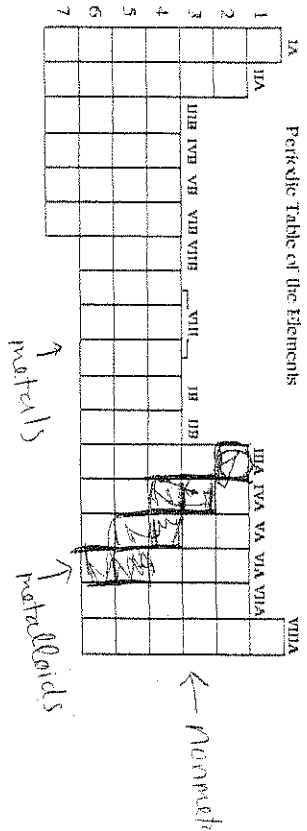
What is the primary difference between the MODERN model of the atom and BOHR'S model?

e^- exist in clouds
 b/c we only know the probability of their location

e^- exist in discrete energy levels



1. Color code the Periodic table: red - metals, yellow - metalloids, orange - nonmetals



2. Define the following periodic trends. On the periodic table, draw arrow across the top from left to right and from the bottom to the top. Indicate if each trend is increasing or decreasing

Ionization energy - Energy it takes to remove an e^-
 $\uparrow \rightarrow$

Atomic radius - size of the atom
 $\downarrow \leftarrow$

Electronegativity - Ability to attract electrons in a bond
 $\uparrow \rightarrow$

Metal Reactivity/Nonmetal Reactivity
 $\downarrow \leftarrow$

3. Compare and contrast the Periodic table of Mendeleev and Moseley

Mendeleev	Moseley
- Organized by mass, - Didn't quite work	- organized by atomic #, - What we use today

4. Answer the following questions?

Which has the larger radius: (Ra) or (N) Ne or (Xe) Cl or (Cl) (Mg) or (Mg²⁺)

Which has the highest first ionization energy? (Li) or (Cs) Ba or (As)

Which is more electronegative: (F) or (Ne) Na or (Mg)

the following properties characteristics of ionic, covalent, or metallic bonding?

Metallic Delocalized electrons in an electron sea

ionic Transfer of electrons

covalent Do not conduct electricity and have low melting points

covalent Sharing electrons

ionic contains anions and cations

covalent Prefixes in name describing number of atoms

Draw the Lewis structure and give the molecular shape for the following molecules. Indicate polar or nonpolar

Magnesium and fluorine

Lewis structure: $Mg \cdot \cdot \cdot F \cdot \cdot \cdot F \cdot \cdot \cdot F \cdot \cdot \cdot F \cdot \cdot \cdot F \cdot \cdot \cdot$

Molecular formula: MgF_2

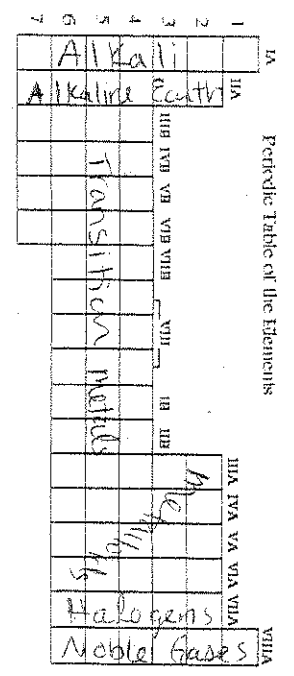
Aluminum and sulfur

Lewis structure: $Al \cdot \cdot \cdot S \cdot \cdot \cdot S \cdot \cdot \cdot S \cdot \cdot \cdot S \cdot \cdot \cdot$

Molecular formula: Al_2S_3

Molecule	Shape	Polar?	Molecule	Shape	Polar?
$H-C-H$	Tetrahedral	No	$O=C=O$	Linear	No
$H-C-N-H$	Tetrahedral	Yes	$O=C=O$	Linear	No
$H-C-Cl$	Tetrahedral	Yes	$Br-Br$	Linear	No
$H-C-Cl$	Tetrahedral	Yes	$H-N-H$	Trig. pyram.	Yes

Green - Halogens
Purple - Noble Gases
Red - Alkali Metals
Yellow - Transition elements
Blue - Alkaline Metals
Black - Semimetals/metalloids
Brown Lanthanides
Orange - Actinides



1. Write acidic, covalent or ionic	2. Write the name or the formula	changes = 0 (acid/acidic)
acidic	H_2SO_4	changes = 0 (acid/acidic)
covalent	CH_4	
ionic	$NaCl$	
covalent	H_2O	
covalent	CO_2	
ionic	$CaCl_2$	
covalent	CH_4	
covalent	H_2O	
ionic	$CaCl_2$	
covalent	CH_4	
covalent	H_2O	
ionic	$CaCl_2$	

CO_2 carbon dioxide	H_2S hydrosulfuric acid	Disphosphorus trisulfide P_2S_3	Carbonic acid H_2CO_3	SO_2 sulfur dioxide
Gold (III) hydroxide $Au(OH)_3$	SnO_2 tin(IV) oxide	Silver oxide Ag_2O	Chlorous acid $HClO_2$	Carbon tetrachloride CCl_4
Aluminum nitrate $Al(NO_3)_3$	Ammonium sulfate $(NH_4)_2SO_4$	Copper (II) carbonate $CuCO_3$	Aluminum phosphide AlP_3	Lead (IV) sulfide PbS_2
Iron (III) acetate $Fe(C_2H_3O_2)_3$	Aluminum chromate $Al_2(CrO_4)_3$	Iron (II) nitrate $Fe(NO_3)_2$	Lithium chloride $LiCl$	Lead (IV) sulfide PbS_2
phosphoric acid H_3PO_4	Magnesium carbonate $MgCO_3$	Iron (II) nitrate $Fe(NO_3)_2$	potassium oxide K_2O	Lead (IV) sulfide PbS_2
nitrous acid HNO_2	dinitrogen trioxide N_2O_3	hexacarbon dihydrogen monoxide $H_2C_6H_6O$	Hydrochloric acid HCl	Zinc nitride Zn_3N_2

Review 7: Chemical Reactions

- Write reaction
- State reaction type
- Use reference table and predict products
- Write NR if no reaction occurs
- If reaction occurs, balance equation

If Double Replacement reactions occur, write net ionic and list spectators

Iron oxide is heated
 $2\text{Fe}_2\text{O}_3 \xrightarrow{\Delta} 4\text{Fe} + 3\text{O}_2$
 Reaction type Decomp.

Heated in the presence of oxygen
 $\text{C}_5\text{H}_{12} + 8\text{O}_2 \rightarrow 5\text{CO}_2 + 6\text{H}_2\text{O}$
 Reaction type Combustion

Aluminum is added to oxygen
 $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$
 Reaction type Synthesis

Added to hydrochloric acid
 $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
 Reaction type Single Replacement

Iron chloride added to sulfuric acid
 $2\text{FeCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + 2\text{HCl}$
 Reaction type Double Replacement
[DNR]

Mercuric chloride is heated
 $2\text{HgCl}_2 \rightarrow 2\text{Hg} + 2\text{Cl}_2$
 Reaction type Decomposition

Copper is added to a solution of silver nitrate
 $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
 Reaction type S.R.

\checkmark NIE: $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}(s)$

Magnesium chloride added to silver nitrate
 $\text{MgCl}_2 + 2\text{AgNO}_3 \rightarrow \text{Mg}(\text{NO}_3)_2 + 2\text{AgCl}$
 Reaction type D.R.
 (aq) (s)

Combustion of butane (C₄H₁₀)
 $2\text{C}_4\text{H}_{10} + 13\text{O}_2 \rightarrow 8\text{CO}_2 + 10\text{H}_2\text{O}$
 Reaction type Combustion

Calcium oxide is added to water
 $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$
 Reaction type Synthesis

Aluminum sulfate is added to ammonium hydroxide
 $\text{Al}_2(\text{SO}_4)_3 + 6\text{NH}_4\text{OH} \rightarrow 2\text{Al}(\text{OH})_3 + 3(\text{NH}_4)_2\text{SO}_4$
 Reaction type D.R.
 NIE: $2\text{Al}^{3+} + 6\text{OH}^- \rightarrow 2\text{Al}(\text{OH})_3(s)$ (s) (aq)

Aluminum is added to silver nitrate
 $\text{Al} + 3\text{AgNO}_3 \rightarrow \text{Al}(\text{NO}_3)_3 + 3\text{Ag}$
 Reaction type S.R.
[DNR]

Fluorine is added to calcium iodide
 $\text{F}_2 + \text{CaI}_2 \rightarrow \text{CaF}_2 + \text{I}_2$
 Reaction type S.R.

Sulfuric acid is added to barium chloride
 $\text{H}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow 2\text{HCl}^{(aq)} + \text{BaSO}_4(s)$
 Reaction type D.R.
 NIE: $\text{Ba}^{2+} + \text{SO}_4^{2-} \rightarrow \text{BaSO}_4(s)$

1. THE MOLE (You must show your work to get any credit)

The ionic formula units are in 25.0 g of magnesium

Find the molarity of a 750 L solution containing 346 g of potassium nitrate

$\frac{1 \text{ mol}}{120.37 \text{ g}} \times \frac{346 \text{ g}}{1} = 2.87 \text{ mol}$	$\frac{346 \text{ g}}{101.1 \text{ g/mol}} = 3.41 \text{ mol}$
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Calculate the number of grams required to make a 50.0 mL solution of 6.0 M sodium hydroxide.

$\frac{1 \text{ mol}}{40.0 \text{ g}} \times 3.0 \text{ mol} = 120 \text{ g}$	$\frac{346 \text{ g}}{101.1 \text{ g/mol}} = 3.41 \text{ mol}$
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The percent composition of a compound is 40.0% C, 6.7% H, and 53.3% O. The molecular mass of the compound is 118 g/mol. Find its empirical and molecular formulas.

$\frac{40.0 \text{ g}}{12.0 \text{ g/mol}} = 3.33 \text{ mol}$	$\frac{6.7 \text{ g}}{1.0 \text{ g/mol}} = 6.7 \text{ mol}$	$\frac{53.3 \text{ g}}{16.0 \text{ g/mol}} = 3.33 \text{ mol}$
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$C_3H_{6.7}O_{3.33} \rightarrow C_3H_7O_3$

2. STOICHIOMETRY (You must show your work to get any credit)

Many grams of copper would be produced from 49.48 grams of chromium (I2) in the reaction: chromium added (sulfate) sulfate?

$\frac{1 \text{ mol}}{52.0 \text{ g}} \times 49.48 \text{ g} = 0.95 \text{ mol}$	$\frac{1 \text{ mol}}{63.5 \text{ g}} \times 0.95 \text{ mol} = 0.015 \text{ mol}$
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$0.015 \text{ mol} \times 63.5 \text{ g/mol} = 0.95 \text{ g}$

The reaction above, how many grams of chromium are required to react with 125 L of 0.75 M copper(II) sulfate?

$0.75 \text{ M} \times 125 \text{ L} = 93.75 \text{ mol}$	$\frac{1 \text{ mol}}{159.0 \text{ g}} \times 93.75 \text{ mol} = 590 \text{ g}$
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Many grams of zinc sulfide are required to react with 12.6 L of oxygen gas at STP in the following reaction? Zinc added to oxygen producing zinc oxide and sulfur dioxide.

$\frac{1 \text{ mol}}{22.4 \text{ L}} \times 12.6 \text{ L} = 0.56 \text{ mol}$	$\frac{1 \text{ mol}}{97.4 \text{ g}} \times 0.56 \text{ mol} = 5.75 \text{ g}$
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50.0 g of lithium reacts with excess oxygen gas to produce lithium oxide. How many grams of lithium oxide are produced?

$\frac{1 \text{ mol}}{7.0 \text{ g}} \times 50.0 \text{ g} = 7.14 \text{ mol}$	$\frac{2 \text{ mol}}{30.0 \text{ g}} \times 7.14 \text{ mol} = 42.84 \text{ g}$
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What number is added to °C to determine temperature in Kelvin?

Convert 735 mmHg to kPa

273	735 mmHg	101.3 kPa
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A gas with a volume of 4.0 L is allowed to expand to a volume of 8.0 L. What happens to the pressure in the container if the temperature remains constant? $P_1 V_1 = P_2 V_2$ inverse, so volume doubles

So P would be halved

What volume will 2.5 moles of oxygen gas occupy at 25 °C and a pressure of 0.20 atm?

$PV = nRT \quad (0.20 \text{ atm})(V) = (2.5 \text{ mol})(0.0821 \text{ atm}\cdot\text{L}/\text{mol}\cdot\text{K})(298 \text{ K})$

$V = 305.8 \text{ L}$

Calculate the number of liters occupied at STP for 6.7 moles of nitrogen

6.7 mol	22.4 L	150.1 L
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If the temperature of a balloon with a volume of 45 mL is raised from 22 °C to 58 °C, what will the new volume be if the pressure remains constant?

$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \frac{45 \text{ mL}}{295 \text{ K}} = \frac{V_2}{331 \text{ K}}$

$V_2 = 50.5 \text{ mL}$

Calculate the pressure of 0.700 mol of a gas at 27 °C that is contained in a volume of 1.50 L

$PV = nRT \quad P(1.50 \text{ L}) = (0.700 \text{ mol})(0.0821 \text{ atm}\cdot\text{L}/\text{mol}\cdot\text{K})(300 \text{ K})$

$P = 11.5 \text{ atm}$

Calculate the mass of 24.0 L of carbon tetrachloride at STP?

24.0 L	1 mol	154 g	17.1 g
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At a temperature of 340 K, a contained gas has a volume of 240.0 mL at 700 Torr pressure. At 340 K, the contained gas has a volume of 60.0 mL. What is the pressure of the gas?

$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \quad \frac{700 \text{ Torr}(240 \text{ mL})}{340 \text{ K}} = \frac{P_2(60 \text{ mL})}{340 \text{ K}}$

$P_2 = 2800 \text{ Torr}$

A student is preparing for a laboratory experiment in which 3 gases will be mixed together. There is a 2L sample of neon gas at a pressure of 2 atm. A 2L sample of carbon dioxide gas at a pressure of 3 atm, and a 2L sample of nitrogen gas at a pressure of 4 atm. All 3 samples are at room temperature. In the experiment the 3 gases will all be transferred to the same rigid 2L container. What is the total pressure the student should expect the gases to exert in the final mixture?

$P_1 = 2 \text{ atm}$
 $P_2 = 3 \text{ atm}$
 $P_3 = 4 \text{ atm}$

Total = 9 atm

$P_T = P_1 + P_2 + P_3$

each type of solid (ionic, molecular, or metallic)

Dip-Dip Attraction between any 2 polar molecules
Dispersion Very weak force that increases with molar mass

Dispersion Attraction between 2 instantaneous dipoles

Hydrogen bond Very strong attractive force between molecules containing H-F
Dispersion Carbon tetrahydride CH_4 (MP)

Dispersion Silicon dioxide SiO_2 (MP) $O = Si = O$

Dispersion Fluorine molecules F_2 (MP)

H-F Dipole Nitrogen trihydride NH_3 (BP)

each type of solid (ionic, molecular, or metallic)

Metallic Atoms surrounded by sea of mobile electrons

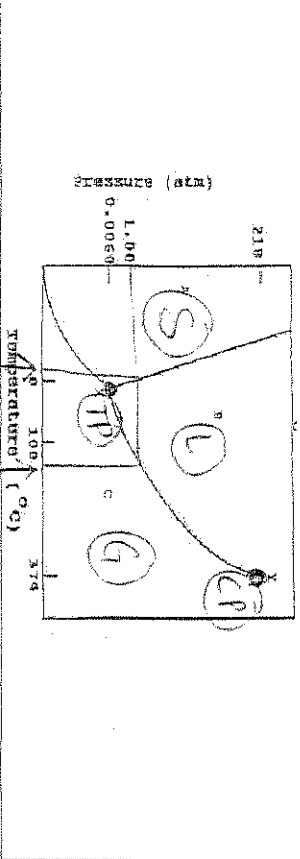
Molecular Connected by intermolecular forces

Ionic Charged particles in a geometric pattern

the relationship between strong intermolecular forces and the boiling point (or melting point) of a substance.

strengths the IMFs, the higher the m.p. & b.p.

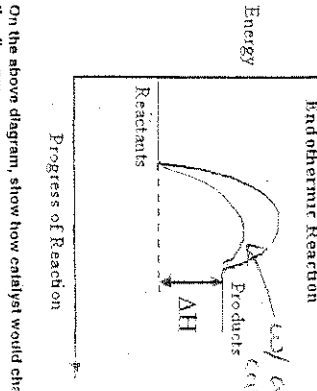
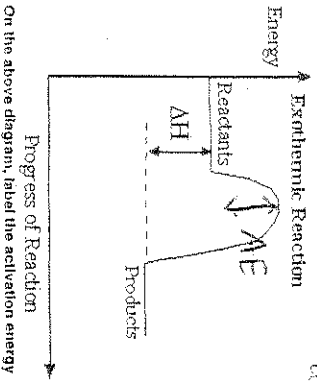
On phase diagram, label the following points: Triple point, normal boiling point, normal melting point, critical point. Also label solid, liquid, gas.



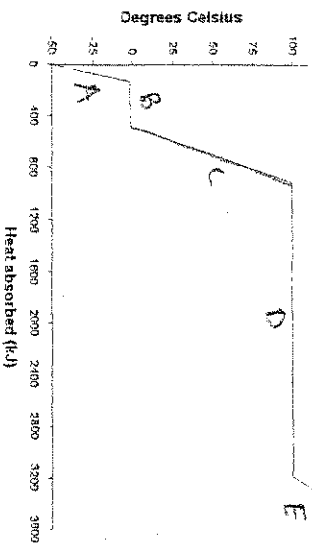
List 3 ways to increase the rate of a reaction

- catalyst - heat - increase surface area

What does a catalyst do? How does it do that?
Speeds up the reaction lowers activation energy



Heating curve



Which letter(s) temperatures? Use the curve above to answer.

D	boiling point	A	solid
C	liquid phase	E	2.02 J/g°C
B	334 J/g	B	melting/freezing
F	vapor	D	condensation/boiling
B, D	no change in kinetic energy	C	4.18 J/g°C
A, C, E	KE is changing	D	heat of vaporization
B	heat of fusion	B	melting point
		A	2.05 J/g°C

What does "equilibrium" mean?
Rate of forward reaction = Rate of reverse reaction

What does it mean if the equilibrium constant (K) is:
 a) greater than 1? products are favored
 b) equal to 1? at equilibrium
 c) less than 1? reactants are favored

Article the at

Heat absorbed to melt 63.0 g of ice at 0°C to water at 0°C?

$$q = (63g)(334 J/g) \quad q = 21,042 J$$

How much heat is released when 10.0 grams of water is cooled from 75°C to 25°C?

$$q = (10g)(4.18 \frac{J}{g \cdot ^\circ C})(75^\circ - 25^\circ) \quad q = -2090 J$$

How much energy is required to change 5.0 grams of ice at -10.0°C to steam at 110°C?

$$q = (5g)(2.05)(0-10) \quad q = -102.5 J$$

$$q = (5g)(4.18)(10-0) \quad q = 209 J$$

$$q = (5g)(2260)(10-110) \quad q = -11300 J$$

How much heat is absorbed when 47.0 grams of magnesium is heated from 21.0°C to 38.0°C?

$$q = m C \Delta T = (47g)(1.023)(38^\circ - 21^\circ) \quad q = 817.4 J$$

Calculate the heat gained by 15.0 g of ice is raised from -25.0°C to -5.0°C?

$$q = m C \Delta T = (15g)(2.05 \frac{J}{g \cdot ^\circ C})(-5 - -25) \quad q = 412.5 J$$

10g of silver metal are heated from 25.0°C to 41.0°C by gaining 192J of heat energy. Calculate the specific heat of silver.

$$-192 J = (5g)(C)(41-25) \quad C = 0.24 J/g \cdot ^\circ C$$

The reaction below, explain if it would shift left or right under each condition. What would happen to the amount of CO₂ for each one?

Shift (left or right)?	CO ₂ (increase or decrease)?
Add O ₂	INCREASE
Add heat	DECREASE
Increase pressure	NO CHANGE
Remove H ₂ O	INCREASE

The equilibrium constant (K) expression for the following reaction: N₂(g) + 3H₂(g) ↔ 2NH₃(g)

$$K = \frac{[NH_3]^2}{[N_2][H_2]^3}$$

State K, using the values given. Concentration of: N₂ = 0.2 M; H₂ = 0.5 M; NH₃ = 1.2 M

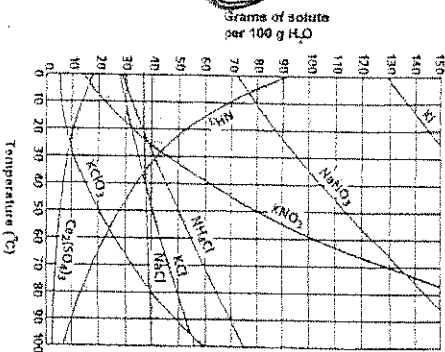
$$K = \frac{(1.2)^2}{(0.2)(0.5)^3} = 57.6$$

Does that number tell you about the reaction? Products are favored. (Shifting toward products.)

Exam Review 12: Solutions

NAME

Use the graph provided to answer the following questions.



18g 1. How many grams of NH₃ can be dissolved in 100 grams of water at 70 °C?

Sat. 2. You have 35 grams of ammonium chloride in 100 grams of water at 50 °C. Is the solution saturated, unsaturated, or super-saturated?

Supersat. 3. A saturated solution of potassium chloride is currently in 100 grams of water at 100 °C. Will it be saturated, unsaturated, or super-saturated when it is cooled to 10 °C?

80g 4. How much sodium nitrate is needed to form a saturated solution at 10 °C?

Complete the following table

State whether each pair is soluble or insoluble	
Soluble	Potassium chloride in water (use sol. rules in ref. table!)
Insoluble	Ammonia (NH ₃) in oil
Insoluble	Carbon tetrachloride in water
How many grams of aluminum chloride are required to make a 2.25 molar solution in 30.0 ml of water?	2.25 mol solution in 30.0 ml of water? 2.25 mol x 133.5 g/mol = 300.4 g
M = $\frac{m}{L}$	2.25 M = $\frac{m}{0.03L}$ mol = 0.075 mol
What volume of 12 M HCl is needed to prepare .25 L of 0.20 M HCl?	0.0625 mol HCl x 133.5 g/mol = 8.34 g
M ₁ V ₁ = M ₂ V ₂	(12M)(V ₁) = (0.2M)(0.25L)
Calculate the molarity of the solution made of 7.5 mole of potassium iodide in 2.8 liters of solution.	V ₁ = 4.2 mL or 0.0042 L
M = $\frac{mol}{L}$	$\frac{7.5 mol}{2.8 L} = 2.7 M$
Calculate the volume required to make a 2.78 M solution of 568.0 grams of sodium nitrate?	568g NaNO ₃ / 1 mol = 6.7 mol
M = $\frac{mol}{L}$	2.78 M = $\frac{6.7 mol}{L}$

$$L = 2.4 L$$

Whether the following are acids or bases

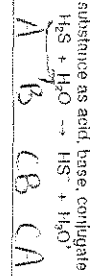
- Have a sour taste **Acid**
- React with metals **Acid**
- Feel slippery **Base**
- Turn blue litmus paper red **Acid**
- Indicators and bases according to Arrhenius **Acid donates H⁺**

Base donates OH⁻

Bronsted-Lowry - Acid gives H⁺

Base receives H⁺

Identify each substance as acid, base, conjugate acid, or conjugate base



the conjugate acids of NH₃, NH₄⁺, Br⁻, HBr

the conjugate bases of H₂O, H₂O, HSO₄⁻, SO₄²⁻

the pH of 0.75 M HCl, also find the pOH

$pH = -\log[H^+] = -\log(0.75) = 0.125$ $pH + pOH = 14$
 $pOH = 14 - 0.125 = 13.875$

the [OH⁻] in a solution with a pH of 9.5

$pH = 9.5$ $pOH = 14 - 9.5 = 4.5$
 $[OH^-] = 10^{-pOH} = 10^{-4.5} = 3.16 \times 10^{-5} M$

is the solution acidic, basic, or neutral? **Basic**

Resists change in pH



of 0.15 M HCl is required to neutralize 25.0 mL of NaOH, what is the molarity of the sodium hydroxide?

$M_1 V_1 = M_2 V_2$ $(0.15 M)(43.5 mL) = M(25 mL)$
 $M = 0.261 M$

is a strong acid strong?

The degree of ionization. (How well it splits into ions)

Process that uses a neutralization reaction

To determine the molarity of an unknown solution

1. Match each description with the appropriate type of radiation: alpha, beta, or gamma

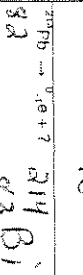
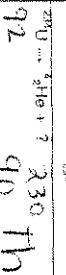
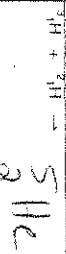
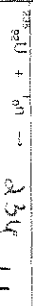
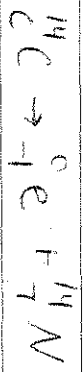
Beta	A negatively charged electron
Gamma	Blocked only by several feet of concrete or lead
Alpha	Blocked by paper or clothing
Alpha	Helium nucleus
Gamma	Radiant energy, no electrical charge, wave - not a particle
Alpha	Has the heaviest mass of all the particles

2. Complete the following equations

Decay of polonium-218 by alpha emission



Decay of carbon-14 by beta emission



4. Half-life calculation

Carbon-14 has a half-life of 5730 years. If a plant contained 2.0 grams of carbon-14 when it died, how much is left after 34,380 years?

$\frac{34,380}{5730} = 6 \text{ (half-lives)}$

$2.0g \xrightarrow{1} 1.0g \xrightarrow{2} 0.5g \xrightarrow{3} 0.25g \xrightarrow{4} 0.125g \xrightarrow{5} 0.0625g \xrightarrow{6} 0.03125g$

0.03125g