

Reference Table Review

Regents Chemistry

Table A Questions:

1. What does STP stand for? _____
2. What are the two units of pressure represented in the table? _____ and _____
3. What are the two units of temperature represented in the table? _____ and _____
4. If a 14 L sample of an unknown gas is **at STP**, what will the new volume be if the temperature is increased to 300 K and the pressure is decreased to 0.25 atm?
5. A 25 mL sample of gas is **at STP**. If temperature remains constant and the pressure changes to 75 kPa, what is the new volume?

*Hint: See
Table T too!*

Table B Questions:

1. Give a synonym for the word fusion. _____
2. Give a synonym(s) for the word vaporization. _____
3. Calculate the amount of heat needed to increase the temperature of 250 g of water from **20°C to 46°C**.
4. How much energy would be required to **melt** 15.0 g of ice at 0°C?
5. How much energy would it take to **boil** 36.0 g of water at 100°C?

*Hint: See Table
T too!*

Table C Questions (*I hate Table C – memorize KHDUdcm*)

1. Convert 706.5 J to kJ: _____
2. Convert 500.0 mL to L: _____
3. Convert 1 L to mL: _____
4. What is the **molarity** of a **4000. mL** solution containing **4 moles** of dissolved NaOH? *See Table T too!*

Table D Questions:

1. What are the units for molarity? _____
2. What do moles measure? _____
3. What units measure the amount of heat released in chemical reactions? _____
4. Aside from molarity, what other units can be used to express concentration (usually of a very dilute substance)? _____
5. What do grams measure? _____
6. What do liters measure? _____

Table E Questions:

1. What is a polyatomic ion?
2. What is the charge of carbonate? _____
3. What is the charge of permanganate? _____
4. Write the chemical formula for ammonium sulfate.
5. Name: NaOH _____
6. Name: $\text{Mg}(\text{NO}_3)_2$ _____

See Table S or PT for names and oxidation states of elements.

Table F Questions

1. Determine if the following ionic compounds are soluble or insoluble:

BaSO₄ _____ ZnCl₂ _____ Fe(OH)₃ _____ Li₃PO₄ _____

2. Which solution would be the most dilute?

A) NaC₂H₃O₂(aq)

B) MgSO₄(aq)

C) AgCl(aq)

D) NH₄OH(aq)

3. Which solution would be the best conductor of electricity?

A) NaNO₃(aq)

B) CaSO₄(aq)

C) Fe(OH)₂(aq)

D) BaCO₃(aq)

4. Which solution has the highest concentration of dissolved particles?

A) NaNO₃(aq)

B) CaSO₄(aq)

C) Fe(OH)₂(aq)

D) BaCO₃(aq)

5. a) Write the products for the neutralization reaction below.

b) Use Table F to determine the phase of each product.

c) If the final solution (products) was poured through a filter, what (if anything) would wind up on the filter and what (if anything) would wind up in the beaker?



Table G Questions:

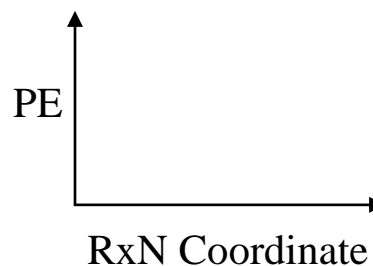
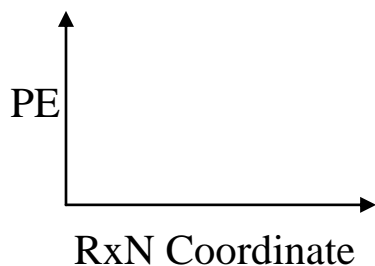
1. What compounds show a decrease in solubility from 0 to 50°C? What does that tell you about their phases?
2. Which salt is most soluble at 60°C? _____
3. Which compound is least soluble at 100°C? _____
4. How many grams of KCl can be dissolved in 50 g of H₂O at 30°C? _____
5. At 50°C, how much KNO₃ can be dissolved in 200 g of H₂O? _____
6. At 30°C, 90 g of NaNO₃ is dissolved in 100 g of H₂O. Is the solution saturated or unsaturated? _____
7. A saturated solution of KClO₃ is formed from 100g of water. If the solution is cooled from 90°C to 70°C, how many grams of precipitate are formed? _____
8. 50 grams of NH₄Cl are dissolved in 100 g of water at 80°C. How much more solute needs to be dissolved to make a saturated solution? _____

Table H Questions:

1. Define the term vapor pressure.
2. What is the vapor pressure of water at 100°C? _____
3. What is the vapor pressure of ethanoic acid at 120°C? _____
4. What is the vapor pressure of propanone at 75°C? _____
5. What is the boiling point of water at STP? _____
6. What is the boiling point of propanone at 70kPa? _____
7. What is the boiling point of ethanoic acid at 80kPa? _____
8. Which substance on Table H has the strongest intermolecular forces? How do you know?

Table I Questions:

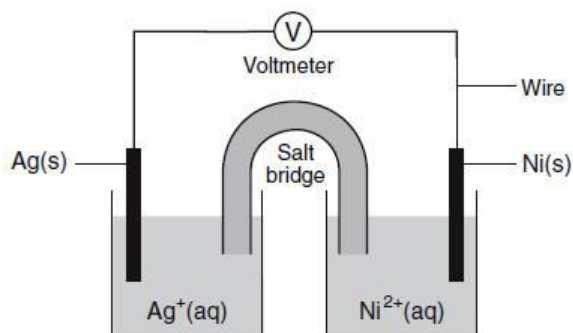
1. What is the formula for calculating heat of reaction (ΔH)? _____
2. Sketch a potential energy diagram for the following reactions and label heat of reaction.
a) $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$ b) $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{NO}(\text{g})$



3. What is the sign of ΔH when a reaction releases energy? _____ Absorbs energy? _____
4. How much energy is absorbed when pure nitrogen and oxygen react to form 2 moles of $\text{NO}_2(\text{g})$? _____
5. How much energy is released when pure carbon and hydrogen react to form 0.5 mol of $\text{C}_2\text{H}_6(\text{g})$? _____

Table J Questions:

1. Is a more active metal easier to oxidize or reduce? _____
2. Is a more active nonmetal easier to oxidize or reduce? _____
3. A solution of CrCl_2 will react with which of the following metals? Ag Al Cu Mg Ni Zn
4. Label the anode and the cathode on the voltaic cell below. Show the direction of electron flow. Write equations for the oxidation and reduction half-reactions.



Oxidation half reaction: _____

Reduction half reaction: _____

Is the reaction spontaneous? How do you know?

What is the energy transformation that occurs?

What is the purpose of the salt bridge?

Table K Questions:

1. What are Arrhenius acids?
2. What is the alternate theory for acids?
3. Given this reaction: $\text{H}_2\text{SO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{HSO}_4^-(\text{aq}) + \text{H}_3\text{O}^+(\text{aq})$ find the acids in the forward and reverse reaction.

Table L Questions:

1. What are Arrhenius bases?
2. What is the alternate theory for bases?
3. Given this reaction: $\text{CH}_3\text{COO}^-(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{CH}_3\text{COOH}(\text{aq}) + \text{OH}^-(\text{aq})$ find the bases in the forward and reverse reaction.

Table M Questions: Describe the color of the indicators in the solutions given below.

pH	Solutions	methyl orange	bromthymol blue	phenolphthalein	litmus	bromcresol green	thymol blue
1	gastric juices						
3	apples, oranges, soda						
7	pure water, blood, saliva						
10	milk of magnesia						

Table N Questions:

1. What is the decay mode of plutonium-239? _____
2. Write the natural transmutation reaction for plutonium-239. _____ \rightarrow _____ + _____
3. What is the half-life of neon-19? _____
4. Which radioisotope decays the fastest? _____
5. Which radioisotope decays the slowest? _____
6. How much of a 24 gram sample of cesium-137 will remain unchanged after 60 years?

Table O Questions:

1. What is the charge and mass of an alpha particle? _____ and _____
2. What is the charge and mass of gamma radiation? _____ and _____
3. What is the charge and mass of beta particle? _____ and _____
4. What is the difference between a beta particle and a positron?

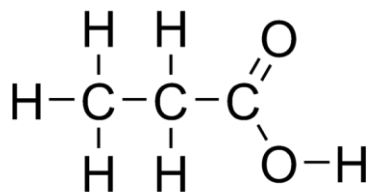
5. What is another term for an electron? _____
6. Which particle has the lowest penetrating power? Why?

7. Which particle has the greatest penetrating power? Why?

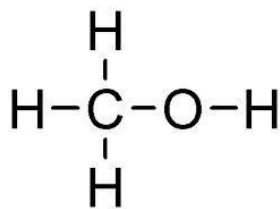
Table P and Q Questions:

Name	Homologous Series	Structural Formula	Condensed Structural Formula	Molecular Formula
pentane	alkane			
			CH ₃ CHCHCH ₃	
				C ₃ H ₄

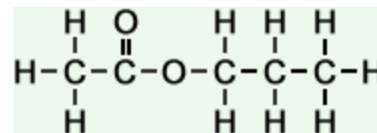
Table R Question: Classify and name or classify and draw the following organic compounds.



ethanal



3-pentanone



2,3-dichlorobutane

Periodic Table Questions:

1. Which elements are in the liquid phase at room temperature?
2. Which elements are in the gas phase at room temperature?
3. What type of elements are on the left side of the staircase?
4. Where are the metalloids?
5. What is the number of e-, p, and n in a neutral atom of nitrogen?
6. What is the atomic mass of xenon?
7. What is the atomic number of barium?
8. What is the electron configuration of iodine?
9. How are the relative atomic masses calculated?
10. What are the selected oxidation states of hydrogen?
11. What is the symbol of krypton?
12. Which group contains noble gases?
13. Is hydrogen considered a metal?
14. What is the difference between helium and the other Noble Gases?
15. What do elements in the same group have in common?
16. What do elements in the same period have in common?
17. What is the name of groups 3-12?
18. What is the name of group 1?
19. What is the name of group 2?
20. What is the name of group 17?
21. How many valence electrons are in an atom of cesium?

Table S Questions:

1. What is the trend in electronegativity down a group? Why?
2. What is the trend in ionization energy down a group? Why?
3. What is the trend in atomic radius down a group? Why?
4. What is the trend in electronegativity across a period? Why?
5. What is the trend in ionization energy across a period? Why?
6. What is the trend in atomic radius across a period? Why?
7. Which element on the periodic table has the greatest attraction for electrons?
8. Which element on the periodic table is the most metallic?
9. Name one element that is solid at STP: _____ How do you know?
10. Name one element that is liquid at STP: _____ How do you know?
11. Name one element that is a gas at STP: _____ How do you know?
12. Which of the following cannot be broken down by chemical means?
A) CO B) NH₃ C) Cu D) CH₄

Table T Questions:

Density

1. An object has a mass of 23 g and a density of 10 g/cm^3 . What is its volume?
2. What is the density of aluminum?

Mole Calculations

1. What is the number of mole in a sample of 45g of H_2O ?
2. What is the mass of 2 moles of H_2O_2 ?

Percent Error

1. A Student calculates the density of iron at STP to be 8.956 g/cm^3 . What is the Percent Error?

Percent Composition

1. What is the percent composition by mass of H in H_2O_2 ?
2. What is the percent, by mass, of water in $\text{MgSO}_4 \cdot 2\text{H}_2\text{O}$?

Concentration

1. How many moles of KOH are contained in 0.250 L of 2.0 M solution of KOH?
2. What is the molarity of a solution of KOH if 1 L of the solution contains 11.2 grams of KOH?
3. What is the concentration in parts per million if a 500 g solution of copper (II) sulfate contains 0.005 g of copper (II) sulfate?

Combined Gas Law

1. If I initially have a gas at a pressure of 12 atm, a volume of 23 liters, and a temperature of 200 K, and then I raise the pressure to 14 atm and increase the temperature to 300 K, what is the new volume of the gas?
2. A gas has a temperature of 14°C, and a volume of 4.5 liters. If the temperature is raised to 29°C and the pressure is not changed, what is the new volume of the gas?

Titration

1. What is a titration? Why is phenolphthalein used as the indicator in the experiment?
2. How many milliliters of 0.50 M NaOH are required to exactly neutralize 20.0 milliliters of 0.20 M HCl?
3. If 100. milliliters of a 3.0 M solution of HCl is exactly neutralized by 80. milliliters of NaOH, what is the molarity of the NaOH solution?

Heat

1. After an experiment using 2 g of water, 20 J was released in the surrounding and the final temperature is 257 K, what was the original temperature of the water?
2. How many Joules are required to melt 1000 g of water?
3. How many Joules are needed to vaporize 10 g of water?

Temperature

1. Convert the followings: 0°C to K, 373 K to $^{\circ}\text{C}$, 35°C to K
2. How is temperature defined?