



CHM 151 Group Activity for Chapters 4 and 5 Name _____

Other Group Members: _____

correct answers are at end

- The balanced net ionic equation for precipitation of CaCO_3 when aqueous solutions of Li_2CO_3 and CaCl_2 are mixed is
 - $2\text{Li}^+(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \longrightarrow \text{Li}_2\text{CO}_3(\text{aq})$
 - $2\text{Li}^+(\text{aq}) + 2\text{Cl}^-(\text{aq}) \longrightarrow 2\text{LiCl}(\text{aq})$
 - $\text{Li}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \longrightarrow \text{LiCl}(\text{aq})$
 - $\text{Ca}^{2+}(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \longrightarrow \text{CaCO}_3(\text{s})$
 - $\text{Li}_2\text{CO}_3(\text{aq}) + \text{CaCl}_2(\text{aq}) \longrightarrow 2\text{LiCl}(\text{aq}) + \text{CaCO}_3(\text{s})$
- Which solution will have the highest concentration of potassium ion?
 - 3.0 M KCl
 - 1.5 M K_3PO_4
 - 2.5 M K_2SO_4
 - 3.0 M KOH
 - 1.5 M KNO_3
- The molar mass of KBr is 119.0. How many grams of KBr are needed to prepare 50.0 mL of a 0.250 M solution?
- The balanced net ionic equation for precipitation of AgI when aqueous solutions of AgNO_3 and NaI are mixed is
 - $\text{Ag}^+(\text{aq}) + \text{I}^-(\text{aq}) \longrightarrow \text{AgI}(\text{s})$
 - $\text{Ag}^+(\text{aq}) + \text{NO}_3^-(\text{aq}) \longrightarrow \text{AgNO}_3(\text{s})$
 - $\text{Ag}^+(\text{aq}) + \text{NO}_3^-(\text{aq}) \longrightarrow \text{AgNO}_3(\text{aq})$
 - $\text{AgNO}_3(\text{aq}) + \text{NaI}(\text{aq}) \longrightarrow \text{AgI}(\text{s}) + \text{NaNO}_3(\text{aq})$
 - $\text{AgNO}_3(\text{aq}) + \text{NaI}(\text{aq}) \longrightarrow \text{AgI}(\text{aq}) + \text{NaNO}_3(\text{s})$
- If 18.5 mL of a NaOH solution is required to neutralize 25.0 mL of 0.457 M HCl, what is the molarity of the NaOH?
- The same amount of heat is added to equal masses of A and B which are at the same initial temperature. After the heat has been absorbed, the temperature of A is greater than the temperature of B. Therefore the specific heat of A is
 - greater than B
 - less than B
 - the same as B
 - a negative value greater than B
 - the negative of B
- Given the heats of the following reactions:
$$2\text{ClF}(\text{g}) + \text{O}_2(\text{g}) \longrightarrow \text{Cl}_2\text{O}(\text{g}) + \text{F}_2\text{O}(\text{g}) \quad \Delta H = 167.4 \text{ kJ}$$
$$2\text{ClF}_3(\text{g}) + 2\text{O}_2(\text{g}) \longrightarrow \text{Cl}_2\text{O}(\text{g}) + 3\text{F}_2\text{O}(\text{g}) \quad \Delta H = 341.4 \text{ kJ}$$
$$2\text{F}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{F}_2\text{O}(\text{g}) \quad \Delta H = -43.4 \text{ kJ}$$
Calculate the heat of the reaction of ethylene with F_2 according to the equation:
$$\text{ClF}(\text{g}) + \text{F}_2(\text{g}) \longrightarrow \text{ClF}_3(\text{g})$$
- Calculate the standard enthalpy of formation of sulfuric acid from the following information.
$$\text{Cu}(\text{s}) + 2\text{H}_2\text{SO}_4(\text{aq}) \longrightarrow \text{CuSO}_4(\text{aq}) + 2\text{H}_2\text{O}(\text{l}) + \text{SO}_2(\text{aq}) \quad \Delta H^\circ_{\text{rxn}} = 178 \text{ kJ}$$
$$\Delta H_f^\circ(\text{CuSO}_4) = -771 \text{ kJ/mol}; \quad \Delta H_f^\circ(\text{H}_2\text{O}) = -286 \text{ kJ/mol}; \quad \Delta H_f^\circ(\text{SO}_2) = -297 \text{ kJ/mol}$$
- How much 0.54 M NaCl, "physiological saline," can be prepared via the dilution of 100 mL of a 6.0 M NaCl solution?
- The amount of heat needed to raise the temperature of 1.00 g of copper 1°C is called its
 - enthalpy.
 - specific heat.
 - molar heat.
 - molar heat capacity.
 - change in energy.

11. Consider the following specific heats of metals.

Metal	Specific Heat
lithium	3.56 J/(g · °C)
gallium	0.372 J/(g · °C)
nickel	0.444 J/(g · °C)
gold	0.129 J/(g · °C)
sodium	1.23 J/(g · °C)

If the same amount of heat is added to 200-g samples of each of the metals, which are all at the same temperature, which metal will attain the lowest temperature?

12. Which answer lists all the following responses that are endothermic and none that are exothermic?

1. boiling water
2. freezing water
3. condensation of steam
4. melting ice

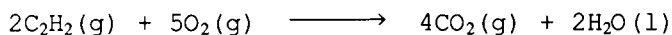
- a. 1 and 2 only b. 2 and 3 only c. 1 and 4 only
d. 2, 3, and 4 only e. 2 and 4 only

13. The sign of ΔH for the process $I_2(s) \longrightarrow I_2(g)$ is
- a. positive, and the process is endothermic.
 - b. negative, and the process is endothermic.
 - c. positive, and the process is exothermic.
 - d. negative, and the process is exothermic.
 - e. impossible to predict with confidence because ΔH_f° for $I_2(s)$ and ΔH_f° for $I_2(g)$ are not given.

14. From a consideration of the reaction: $2SO_2(g) + O_2(g) \longrightarrow 2SO_3(g)$ $\Delta H = -192.8$ kJ

if 2.00×10^2 g of SO_3 were produced, then the amount of heat released should be ___?

15. For the reaction



[ΔH_f in kJ/mol are $O_2(g)$, 0; $C_2H_2(g)$, +226.7; $CO_2(g)$, -393.5; $H_2O(l)$, -285.8] the ΔH of reaction is

- a. $2(-285.8) + 4(-393.5) + 2(226.7)$. b. $2(-285.8) + 4(-393.5) - 2(226.7)$.
c. $2(285.8) + 4(393.5) + 2(226.7)$. d. $2(285.8) + 4(393.5) - 2(226.7)$.
e. $-285.8 - 393.5 + 226.7$.

16 A 31.5 mL aliquot of $H_2SO_4(aq)$ of unknown concentration was titrated with 0.0134 M $NaOH(aq)$. It took 23.9 mL of the base to reach the endpoint of the titration. What was the concentration (M) of the acid?

17. What volume (mL) of 7.48×10^{-2} M phosphoric acid can be neutralized with 115 mL of 0.244 M sodium hydroxide?

18. Be sure to work all assigned homework problems.

Answers: 1d, 2c, 3e, 4a, 5. 0.617M, 6b, 7. -108.7 kJ, 8. -909 kJ/mol, 9. 1.1 L
10b, 11 lithium, 12c, 13a, 14. 241kJ, 15b. 16. 0.0051 17. 125 mL