

Practice Problems Set #4

DIRECTIONS:

- YOU MUST ANSWER EVERY QUESTION IN ORDER TO GET ANY CREDIT!!!
- HIGHLIGHT EACH QUESTION NUMBER ON YOUR NOTEBOOK PAPER SO I CAN QUICKLY SEE THAT YOU HAVE DONE ALL THE PROBLEMS. IF I CAN'T FIND AN ANSWER, YOU WON'T GET CREDIT FOR ANY OF THE PROBLEMS!!!!
- HIGHLIGHT ANY QUESTION NUMBERS ON THIS PAGE THAT YOU WANT HELP WITH, HAVE QUESTIONS WITH, ETC!!!

Q #	QUESTION
1	In the reaction $N_2 + 3H_2 \rightarrow 2NH_3$, how many moles of ammonia would be produced from 3.8 moles of nitrogen gas?
2	In the following unbalanced equation, how many moles of water will be produced from 6 moles of oxygen gas? $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$
3	What mass of NH_3 will be produced when 60.4 grams of H_2 are reacted? $N_2 + 3H_2 \rightarrow 2NH_3$
4	What mass of CO_2 will be produced when 12.5 grams of C_2H_4 are reacted in this unbalanced equation? $C_2H_4 + O_2 \rightarrow CO_2 + H_2O$
5	How many moles of hydrogen are required to react with 9.6×10^{31} molecules of Cl_2 in the following unbalanced reaction: $H_2 + Cl_2 \rightarrow HCl$?
6	Is the following reaction endothermic or exothermic? $2NO + H_2 \rightarrow N_2O + H_2O + 36 \text{ kJ}$
7	Is the following reaction endothermic or exothermic? $CO_2 + H_2 + \text{heat} \rightarrow CO + H_2O$
8	Is the following reaction endothermic or exothermic? $N_2 + 3H_2 \rightarrow 2NH_3 \Delta H = -22 \text{ kJ}$
9	Which of the following are endothermic and which are exothermic? An ice cube melting, Water freezing, A piece of wood burning, Water boiling
10	The specific heat capacity of a substance is $0.87 \text{ J/g}^\circ\text{C}$. How many joules of energy are needed to warm 4.3 grams of it from 20°C to 39°C ?
11	The amount of heat needed to heat 5 grams of a substance from 30°C to 90°C is 190 J. What is the specific heat capacity?
12	It takes 480 J to heat up 10 grams of a substance with a specific heat capacity of $0.18 \text{ J/g}^\circ\text{C}$. What was the change in temperature?
13	How much energy is required to melt 20 grams of ice at -30°C to liquid water at 50°C ?
14	How much energy is required to melt 40 grams of ice to steam at 130°C ?
15	How much energy is required to melt 3 grams of ice at -15°C to steam at 150°C ?
16	Write a paragraph describing the difference between Thermo and Kinetics
17	Draw an energy diagram and label the activation energy for an endothermic reaction.
18	Draw an energy diagram and label the activation energy for an exothermic reaction.
19	What factors can speed up or slow down a reaction?
20	A solution is prepared by dissolving 10 grams of sodium sulfide in enough water to make 200 mL of solution. What is the molarity?
21	A solution is prepared by dissolving 30 grams of potassium sulfate in enough water to make 100 mL of solution. What is the molarity?
22	What mass of solute is contained in 390 mL of a 0.587 M calcium chloride solution?
23	What is collision theory?
24	How does collision theory explain why reaction rates change when you change concentration and temperature?
25	What is a catalyst, and how does it work? Sketch a graph to show how it works.
26	Balance and write the rate expression: $PCl_5(g) \rightarrow PCl_3(g) + Cl_2(g)$ $HI(g) \rightarrow H_2(g) + I_2(g)$ $NO(g) + H_2(g) \rightarrow N_2O(g) + H_2O(g)$
27	Solid phosphorus and oxygen gas react to form tetraphosphorus decoxide. Determine the average rate of reaction for oxygen during the first 20 s if the concentration changes from 0.400 mol/L to 0.000 mol/L during this time interval.
28	At 40°C , hydrogen chloride gas will form from the reaction of gaseous hydrogen and chlorine, according to the following balanced chemical equation: $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$. Using the data provided, calculate the average rate of reaction between times 0 sec and 5.42 sec.

Concentration (mol/L)	
Time (s)	HCl (g)
0	0.000
2.16	1.000
5.42	1.500