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‼!**

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| **Q #** | **QUESTION** | |
| 1 | In the reaction N2 + 3H2 🡪 2NH3, 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? C3H8 + O2 → CO2 + H2O | |
| 3 | What mass of NH3 will be produced when 60.4 grams of H2 are reacted?  N2 + 3H2 🡪 2NH3 | |
| 4 | What mass of CO2 will be produced when 12.5 grams of C2H4 are reacted in this unbalanced equation? C2H4 + O2 🡪 CO2 + H2O | |
| 5 | How many moles of hydrogen are required to react with 9.6 x 1031 molecules s of Cl2 in the following *unbalanced* reaction: H2 + Cl2 🡪 HCl ? | |
| 6 | Is the following reaction endothermic or exothermic? 2NO + H2 🡪 N2O + H2O + 36 kJ | |
| 7 | Is the following reaction endothermic or exothermic? CO2 + H2 + heat 🡪 CO + H2O | |
| 8 | Is the following reaction endothermic or exothermic? N2+3H2 🡪 2NH3 ΔH=-22kJ | |
| 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 J/g°C. How many joules of energy are needed to warm 4.3 grams of it from 20°C to 39°? | |
| 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 0.18J/g°C. What was the change in temperature? | |
| 13 | How much energy is required to melt 20 grams of ice at -30oC to liquid water at 50oC? | |
| 14 | How much energy is required to melt 40 grams of ice to steam at 130oC? | |
| 15 | How much energy is required to melt 3 grams of ice at -15C to steam at 150oC? | |
| 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: PCl5 (g) 🡪 PCl3 (g) + Cl2 (g)  HI(g) 🡪H2(g) + I2(g) NO (g) + H2(g) 🡪 N2O (g) + H2O (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 40ºC, hydrogen chloride gas will form from the reaction of gaseous hydrogen and chlorine, according to the following balanced chemical equation: H2 (g) + Cl2 (g) → 2 HCl (g). Using the data provided, calculate the average rate of reaction between times 0sec and 5.42 sec. | |  |  | | --- | --- | |  | **Concentration (mol/L)** | | **Time (s)** | **HCl (g)** | | 0 | 0.000 | | 2.16 | 1.000 | | 5.42 | 1.500 | |