**Name:**

**Study Guide- Ch 17 Thermodynamics and Ch 14 Gas Laws**

1. Define Heat. How does it travel?
2. Define Temperature.
3. What does the 1st Law of Thermodynamics state?
4. Compare and contrast an exothermic rxn vs. an endothermic rxn. Include heat (energy) transfer, +/- signs.
5. Draw and lab the potential energy diagrams for endothermic and exothermic rxns.
6. What is the surroundings in a rxn? System?
7. In an exothermic rxn, does energy go from the system to the surrounding? Or surroundings to the system? In an endothermic rxn?
8. Define the following as exothermic or endothermic:
9. a puddle of water evaporating into a gas in the sunlight
10. water condensing from a gas to a liquid (like dew forming on a cold glass of juice)
11. Ice cream melting on a hot sunny day
12. sitting down on a cold metal bench, the bench feels cold because
13. In a chemical reaction, if more energy is required to make the chemical bonds than to break them apart, the reaction is endothermic. What evidence will occur to indicate it is endothermic?
14. Define specific heat? What is the equation used?
15. A 245.7g sample of metal at 75.2 degrees Celsius was placed in 115.43g water at 22.6 degrees Celsius. The final temperature of the water and metal was 34.6 Celsius. What is the specific heat of the metal?
16. How much heat is released when 30 g of water at 96°C cools to 25°C?
17. The temperature of a sample of water increases from 20°C to 46.6°C as it absorbs 5650 Joules of heat. What is the mass of the sample?
18. Define Latent heat.
19. Define latent heat of fusion. What is the formula?
20. Define latent heat of vaporization. What is the formula?
21. Draw and label a heating/cooling curve. Which curve should give us positive q values? Negative?
22. How much energy would be required to melt 15.0 g of ice at 0 oC?  Is this process exothermic or endothermic?
23. How many grams of steam could be condensed at 100 o C with the removal of 4230 J of energy? Is this process exothermic or endothermic?
24. How much energy would it take to warm 30.0 g of water at 35 oC to the boiling point and boil all the liquid away? Is this process exothermic or endothermic?
25. How much energy would be required to melt 15.0 g of ice at 0 oC? Is this process exothermic or endothermic?
26. What is Avogadro’s Law?
27. When the pressure on a gas increases, will the volume increase or decrease?
28. When temperature increases, will the volume increase or decrease?
29. When temperature increases, will the pressure increase or decrease?
30. A gas occupies 4.31 liters at a pressure of 0.755 atm. Determine the volume if the pressure is increased to 1.25 atm.
31. A sample of neon is at 89 oC and 123 kPa. If the pressure changes to 145 kPa and the volume remains constant, find the new temperature, in oC.
32. A tank of nitrogen has a volume of 14.0 L and a pressure of 760.0 mm Hg. Find the volume of the nitrogen when its pressure is changed to 400.0 mm Hg while the temperature is held constant.
33. A sample of sulfur dioxide (SO2) is initially at a temperature of 133 oC, a volume of 20 L, and a pressure of 850 mm Hg. If the volume changes to 25 L and the temperature increases to 181 oC, find the new pressure.
34. A sample of argon gas at STP occupies 56.2 liters. Determine the number of moles of argon.
35. If I have a 50 liter container that holds 45 moles of gas at a temperature of 2000 C, what is the pressure inside the container?
36. Some students believe that teachers are full of hot air. If I inhale 2.2 liters of gas at a temperature of 18◦C and it heats to a temperature of 38◦C in my lungs, what is the new volume of the gas?
37. A canister contains 425 kPa of carbon dioxide, 750 kPa of nitrogen, and 525 kPa of oxygen. What is the total pressure of the container?