Chemistry
Study Guide: Ch 10 States of Matter

1. Be able to explain kinetic energy.
2. Two things that the kinetic theory states:
3. The three basic assumptions of kinetic theory as it applies to gases. (An elastic collision is one in which the average kinetic energy of two particles after a collision is the same as their average before the collision. Particles larger than molecules do not go through elastic collisions.)
4. What causes pressure?
5. What constitutes a vacuum? Why does a vacuum not exert a pressure?
6. Understand and be able to explain Fig. 10.1 on p. 286 **Pressure is a hitting thing.**
7. Atmospheric pressure
8. How a Hg barometer works and what it measures. Be able to explain Fig 10.2 on p. 269.
9. 1.00 atm = 760 mmHg = 760 Torr = 101.3 kPa = 14.7lbs/in^2

Work 1 and 2 on p 271

10. STP for gases
11. What happens to the average kinetic energy of a collection of particles.
12. Why does average have to be used when referring to the kinetic energy of a particle or a collection of particles?
13. Significance of absolute zero as it relates to kinetic energy of particles.
14. **Temperature is a measure of the average kinetic energy of the particles (solid, liquid or gas) in a substance.** If the Kelvin temperature doubles, the average kinetic energy of the particles in that substance doubles.
15. What is the relationship of physical state to average kinetic energy at any given temperature?
16. Understand and be able to explain Fig. 10.4 on p. 272
17. What is cryogenics?

Answer 3-7 on p 272.

18. What are the intermolecular forces?
19. What conditions are necessary for the particles of a liquid to escape into the gaseous state?
20. Why are liquids and solids more dense than gases? Why are gases more compressible than liquids or solids?
21. What are the two condensed states of matter?
22. What is the relationship between vaporization and evaporation?
23. What two conditions must be met by a particle in order for it to evaporate?
24. Why do liquids evaporate faster when heated? Which particles tend to escape first? What does this do to the average kinetic energy of the remaining molecules in the liquid? Why?
25. Why is evaporation called a cooling process?
26. What is a vapor? What is a vapor pressure?
27. What two process must be equal in vapor phase equilibrium?
28. Understand and be able to explain Fig 10.7 on p. 275.
29. Be able to explain why an increase in temperature leads to an increase in equilibrium vapor pressure. Understand and be able to explain Fig.10.9 on p. 277. What is a manometer?
30. Study Table 10.1 on p 276. Do all liquids have ht same vapor pressure at the same temperature? In which one of the three liquids would you expect the particles to have weaker intermolecular attractions? stronger?

31. When a liquid and its vapor reach equilibrium the system is said to be **saturated** with vapor since the gas phase is holding all the vapor it can hold at that temperature?
32. What is the relationship between vaporization and boiling?
33. What is the relationship between vapor pressure, atmospheric pressure, and boiling point.
34. What is the relationship between altitude and boiling point? Understand and be able to explain Fig. 10.10 on p. 278.
35. What is normal boiling point? Particles in which liquid would be expected to have a stronger intermolecular attractions based on normal boiling point? Explain
36. Study Fig. 10.2 on p. 279. What happens to vapor pressure, for each liquid as temperature increase? Be able to explain why chloroform has the weakest intermolecular attractions between particles while ethanoic acid ahs the strongest.

Answer 8-13 on p. 279.

37. Describe the motion of particles in a solid.
38. What is melting point?
39. Relate the melting points of molecular solids to ionic solids. Give an example of a substance that does not melt. What happens to it instead of melting?
40. What is a crystal?
41. What determines the melting point of a crystal.
42. What is a unit cell? allotrope? amorphous substance?
43. What are the three allotropes of carbon? **Answer 16 on p. 283.**
44. What is a phase diagram? What is the triple point? (critical temperature and critical pressure)
4. What is sublimation? Give three examples of solids that sublime.

Answer 18 and 19 on p. 286

Answer 20-55, 57-65,70