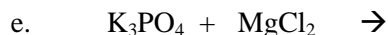
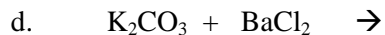
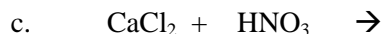
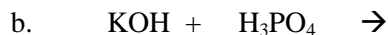
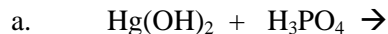
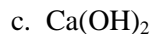


AR Chemistry Final Review: Part II

1. Predict the formulas created in the following double replacement reactions



2. What are the atomic masses for the following compounds?



3. What is the term for the energy of motion? stored energy?

4. What is the definition for Pressure?

5. In what direction(s) does air pressure push?

6. What causes air pressure?

7. What determines standard atmospheric pressure?

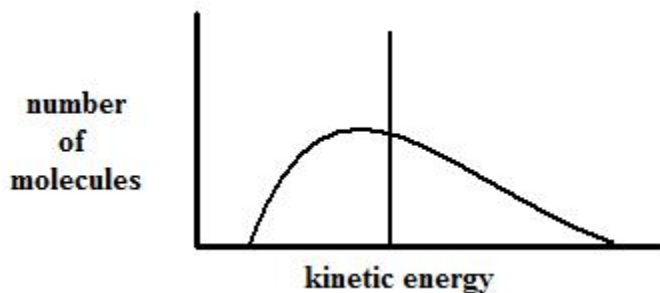
8. What are 3 measurements for standard atmospheric pressure?

9. Why does air pressure hold up 760 mm of Hg regardless of the diameter of the barometer?

10. What does temperature measure?

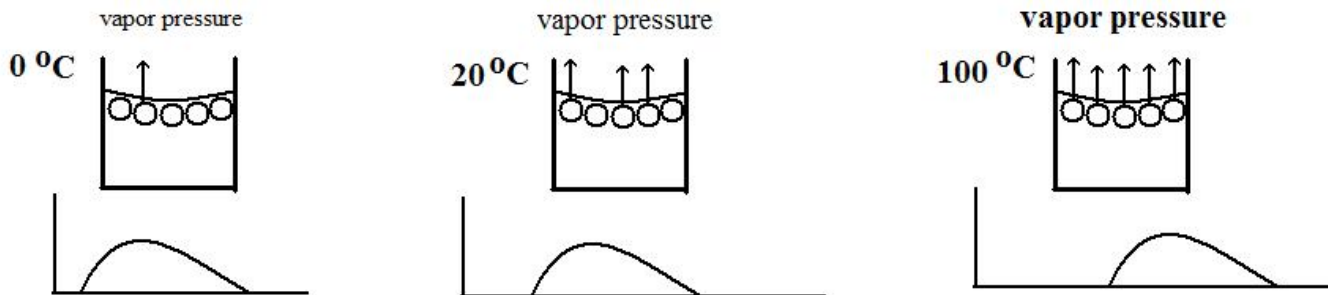
11. What does "average kinetic energy" mean and how does it relate to movement of particles?

12. What is the shape of the particles / kinetic energy graph (below) called?



13. What happens to the shape above when the temperature is lowered? raised?

14. What does the line in the middle measure for a sample (not average KE)?



15. What is vapor pressure?

16. What happens to vapor pressure as the temperature of the liquid rises? falls?

17. What conditions (pressure) are required for a liquid to boil?

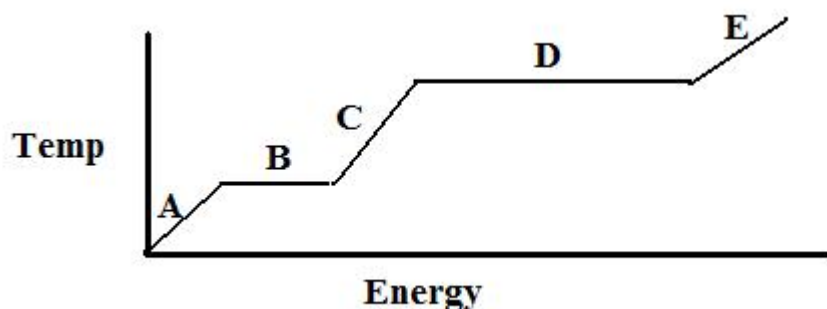
18. Why does water boil at a lower temperature in the mountains?

19. What is the melting point of a solid?

20. If solids are considered to have atoms 1 unit apart, how far apart are atoms in liquids? gases?

21. Most solids are not held together with chemical bonds. What is the term for the attraction that holds them together?

22. A liquid has a high IMA.
- Will the vapor pressure be high or low?
 - Will the boiling point be high or low?



- What part of the heating curve above demonstrates boiling and condensing?
- What part of the heating curve above demonstrates heating and cooling of a liquid?
- What part of the heating curve above demonstrates heating and cooling of a gas?
- What part of the heating curve above demonstrates melting and freezing?
- What part of the heating curve above demonstrates heating and cooling of a solid?
- When a material melts, energy is put into the material but the temperature doesn't increase. Where does the applied energy go if not for increasing the temperature?

Electrons in Atoms: History

- What experiments / claims to fame, etc. did the following scientists develop along the history of the atom?
 - Democritus
 - Aristotle
 - Dalton
 - JJ Thomson
 - Rutherford
 - Millikan
 - Planck
 - Bohr
 - Heisenberg
 - Einstein
- What were the models of the atom proposed by the following scientists?
 - JJ Thomson
 - Rutherford
 - Bohr

- What are the 6 ranges of the electromagnetic spectrum from low energy to high energy?
- Which has a greater energy: a wave with a large wavelength or one with a large frequency?
- What is the term for the "bar code" given off from each element in a high voltage vacuum tube?

Electron Configurations

- What is the term for the probable location of an electron around an atom (holds 2 electrons)?
- What is the term for the shape of the probable location of an electron around an atom?
- What are the four types of subshells?
- What shell is the first to get an 's' orbital? 'p' orbital? 'd' orbital? 'f' orbital?
- What element is the first to get an 's' electron? 'p' electron? 'd' electron? 'f' electron?
- What is the final electron configuration for the following elements?
 - He
 - Ca
 - Au
 - Xe
 - Br
- What element has the final electron configuration of ??
 - $2s^1$
 - $3p^3$
 - $4d^4$
 - $5f^5$
- How many quantum numbers are needed to demonstrate that every electron has a unique energy?

AR Chemistry Final Review: Part II **Answers**

1. Predict the formulas created in the following double replacement reactions

- $\text{Hg}(\text{OH})_2 + \text{H}_3\text{PO}_4 \rightarrow \text{Hg}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$
- $\text{KOH} + \text{H}_3\text{PO}_4 \rightarrow \text{K}_3\text{PO}_4 + \text{H}_2\text{O}$
- $\text{CaCl}_2 + \text{HNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{HCl}$
- $\text{K}_2\text{CO}_3 + \text{BaCl}_2 \rightarrow \text{KCl} + \text{BaCO}_3$
- $\text{K}_3\text{PO}_4 + \text{MgCl}_2 \rightarrow \text{Mg}_3(\text{PO}_4)_2 + \text{KCl}$

2. What are the atomic masses for the following compounds?

- N_2 **28.02**
- H_2O **18.02**
- $\text{Ca}(\text{OH})_2$ **74.10**

3. What is the term for the energy of motion? **kinetic energy** stored energy? **potential energy**

4. What is the definition for Pressure? **Pressure = Force / Area**

5. In what direction(s) does air pressure push? **all directions**

6. What causes air pressure? **the weight of the air above us**

7. What determines standard atmospheric pressure? **average air pressure at sea level**

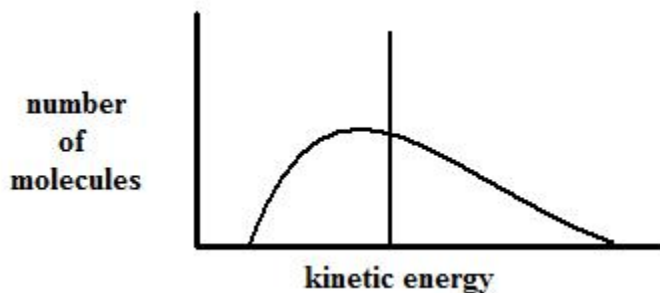
8. What are 3 measurements for standard atmospheric pressure? **1 atmosphere, 760 mm Hg, 14.7 lbs/in²**

9. Why does air pressure hold up 760 mm of Hg regardless of the diameter of the barometer? **it is a ratio**

10. What does temperature measure? **average kinetic energy in a sample**

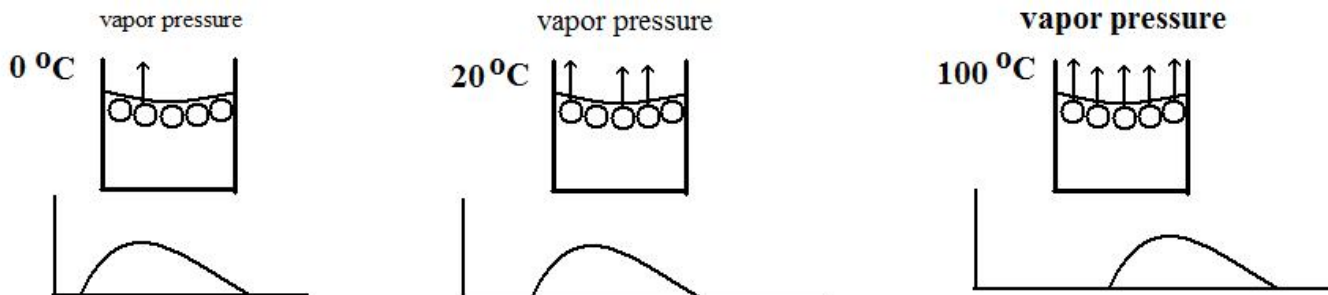
11. What does "average kinetic energy" mean and how does it relate to movement of particles? **some are really fast**

12. What is the shape of the particles / kinetic energy graph (below) called? **Poisson Distribution** and some are slow



13. What happens to the shape above when the temperature is lowered? **shifts to the left** raised? **shifts to the right**

14. What does the line in the middle measure for a sample (not average KE)?



15. What is vapor pressure? **the pressure of evaporation (dynamic equilibrium between liquid and gas phases)**

16. What happens to vapor pressure as the temperature of the liquid rises? **increases** falls? **decreases**

17. What conditions (pressure) are required for a liquid to boil? **vapor pressure greater / equal to air pressure**

18. Why does water boil at a lower temperature in the mountains? **lower air pressure, lower temp required**

19. What is the melting point of a solid? **temperature that a material changes between solid and liquid phases**

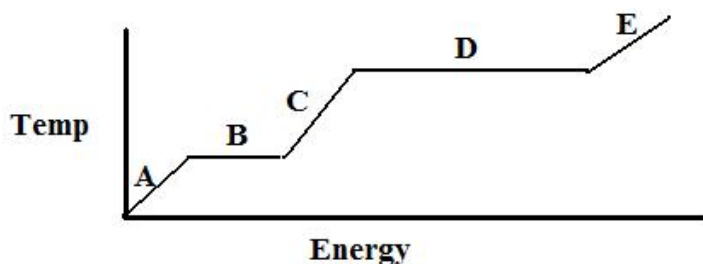
20. If solids are considered to have atoms 1 unit apart, how far apart are atoms in liquids? **1 1/8** gases? **1000**

21. Most solids are not held together with chemical bonds. What is the term for the attraction that holds them together? **intermolecular attraction (IMA)**

22. A liquid has a high IMA.

a. Will the vapor pressure be high or low? **low – high IMA lets only a few escape**

b. Will the boiling point be high or low? **high -- since only a few escape, need higher temp for boiling**



23. What part of the heating curve above demonstrates boiling and condensing? **D**

24. What part of the heating curve above demonstrates heating and cooling of a liquid? **C**

25. What part of the heating curve above demonstrates heating and cooling of a gas? **E**

26. What part of the heating curve above demonstrates melting and freezing? **B**

27. What part of the heating curve above demonstrates heating and cooling of a solid? **A**

28. When a material melts, energy is put into the material but the temperature doesn't increase. Where does the applied energy go if not for increasing the temperature? **overcoming IMA – moving molecules apart**

Electrons in Atoms: History

29. What experiments / claims to fame, etc. did the following scientists develop along the history of the atom?

a. Democritus **came up with the first atomic model**

b. Aristotle **claimed that everything was made of either fire, water, earth, or air**

c. Dalton **rediscovered the atomic model through the study of gases**

d. JJ Thomson **discovered the electron using cathode rays**

e. Rutherford **shot alpha particles through gold foil – discovered the nucleus**

f. Millikan **discovered the charge of an electron**

g. Planck **came up with $E = hf$ (energy is related to frequency)**

h. Bohr **proposed energy levels of hydrogen atoms based on $E = hf$ (light MUST be a wave)**

i. Heisenberg **proposed that one cannot both know the position and velocity of an electron**

j. Einstein **proposed the Photoelectric Effect: that light MUST be a particle**

30. What were the models of the atom proposed by the following scientists?

a. JJ Thomson **plum pudding model: positive gelatin with negative particles (plums)**

b. Rutherford **satellite model**

c. Bohr **electrons move between levels that have different, distinct, energies**

31. What are the 6 ranges of the electromagnetic spectrum from low energy to high energy?

radio infrared visible light ultraviolet x-rays gamma

32. Which has a greater energy: a wave with a large wavelength or one with a large frequency? **higher frequency $E=hf$**

33. What is the term for the “bar code” given off from each element in a high voltage vacuum tube? **emission spectra**

Electron Configurations

34. What is the term for the probable location of an electron around an atom (holds 2 electrons)? **orbital**

35. What is the term for the shape of the probable location of an electron around an atom? **electron cloud**

36. What are the four types of subshells? **s, p, d, f**

37. What shell is the first to get an ‘s’ orbital? **1** ‘p’ orbital? **2** ‘d’ orbital? **3** ‘f’ orbital? **4**

38. What element is the first to get an ‘s’ electron? **H** ‘p’ electron? **B** ‘d’ electron? **Sc** ‘f’ electron? **Ac or Ce (Ce)**

39. What is the final electron configuration for the following elements?

a. He **$1s^2$** b. Ca **$4s^2$** c. Au **$5d^9$** d. Xe **$5p^6$** e. Br **$4p^5$**

40. What element has the final electron configuration of ??

a. $2s^1$ **Li** b. $3p^3$ **P** c. $4d^4$ **Mo** d. $5f^5$ **Np or Pu**

41. How many quantum numbers are needed to demonstrate that every electron has a unique energy? **4**