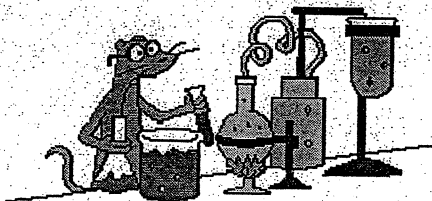


KEY

Review for Chemistry I FINAL EXAM



1. What is the first (and largely most important) step of the scientific method?

making observations

2. Identify the compressibility and density of gases compared to liquids compared to solids.

gases are compressible, solids are not.
solids are more dense than gases.

3. List 6 physical properties. Then, give an example of each that shows you understand those properties.

- | | |
|-----------------|--------------|
| a. color | conductivity |
| b. malleability | density |
| c. ductility | boiling pt. |
| d. odor | freezing pt. |
| e. phase | melting pt. |
| f. ductility | |

4. List 6 physical changes (the physical changes of state). Then, give an example of each that shows you understand those changes.

a. evaporation $L \rightarrow G$

b. melting $S \rightarrow L$

c. condensation $G \rightarrow L$

d. sublimation $S \rightarrow G$

e. deposition $G \rightarrow S$

f. freezing $L \rightarrow S$

5. List 3 chemical properties. Then, give an example of each that shows you understand those properties.

a. ability to react w/ acid

b. ability to react w/ oxygen

c. ability to react w/ base

6. List 3 **chemical changes**. Then, give an example of each that shows you understand those changes.

a. temperature change

b. production of gas

c. color change

7. Describe the difference between a **heterogeneous mixture** and a **homogeneous mixture**. Give one example of each.

- homogeneous mixture looks the same through out - small size particles

- heterogeneous mixture has visually different particles

8. What is the fundamental difference between a **mixture** and a **compound**?

Mixtures are substances that are not chemically bound together & can be reversed using physical means (distillation, filtration, crystallization)

9. What is the **Law of Conservation of Mass**. Give an example.

mass of reactants = mass of products

10. What is the representative particle for:

Element: atom

Covalent compound: molecule

Ionic compound: formula unit

11. What are the 5 principles which make up Dalton's Atomic Theory? Which are still true today? *

- All matter is made up of atoms that are indivisible.
- An element is a type of matter w/ one type of atom and unique mass.
- * A compound is matter made up of 2 or more elements in fixed ratios.
- * A chemical reaction consists of the rearrangement of atoms.
- * A chemical rxn. can only be reversed w/ another chem. rxn.

12. What is an isotope? Give an example and explain.

same type atoms (same element)
but differ in # of neutrons (mass #)

13. What was Rutherford's model of the atom and what experiment did he do?

Gold foil experiment - showed
nucleus of atom is very small
but very massive.

14. What did Millikan's Oil Drop experiment show? What did he do?

showed the charge of an e^-

15. What's the difference between a group and a period on the periodic table?

group - vertical column
period - horizontal row

16. What are the halogens and how many valence electrons do they have?

Group 17 - 7 val. e^-

17. What type of ions end in -ide?

binary ionic + covalent

18. Describe the physical properties of covalent compounds.

low melting pt.
no conductivity (when dissolved in water)
soluble in water

19. Describe the physical properties of ionic compounds.

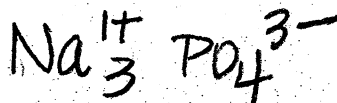
soluble in water
good conductors (when dissolved in water)
high melting pt.

20. How do you know when you have a polyatomic ion?

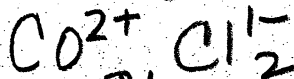
see polyatomic ion sheet when ending of anion is anything but -ide

21. Write the correct formulas for the following. Remember, if IONIC, include charges.

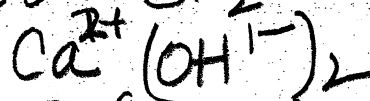
a. sodium phosphate



b. cobalt (II) chloride



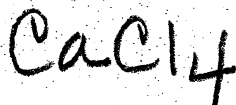
c. calcium hydroxide



d. iron (III) sulfate



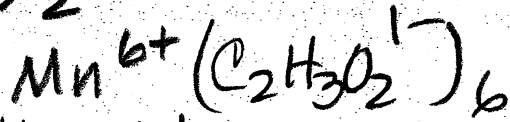
e. carbon tetrachloride



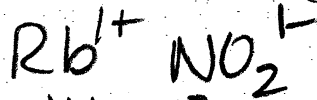
f. silicon dioxide



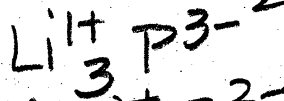
g. manganese (VI) acetate



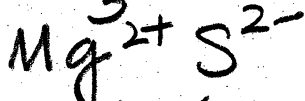
h. rubidium nitrite



i. lithium phosphide



j. magnesium sulfide



k. barium phosphate

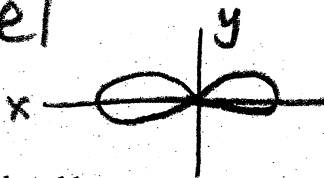


l.

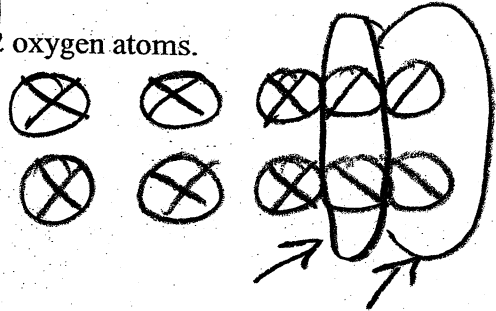
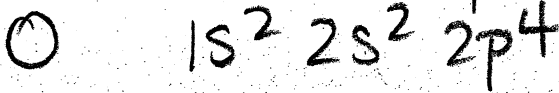
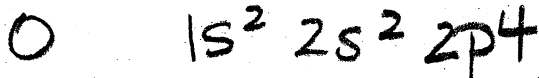
22. What does the principal quantum number for an atom represent?

energy level

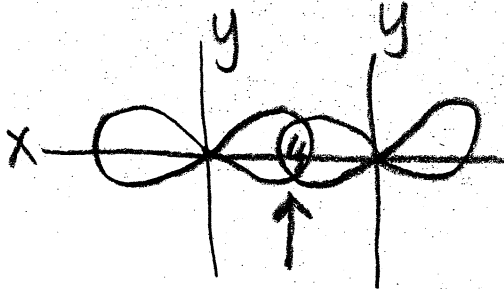
23. Draw a representative p orbital.



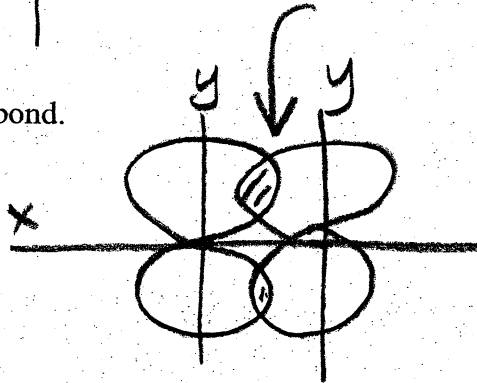
24. Draw an orbital diagram showing a double bond between 2 oxygen atoms.



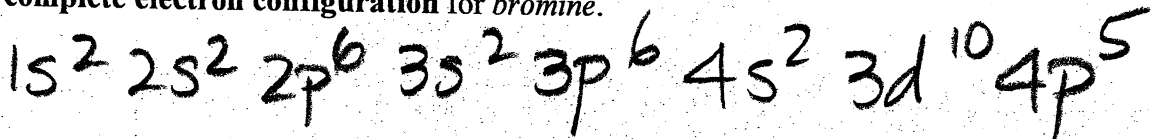
25. Draw, using x, y axes, a σ bond.



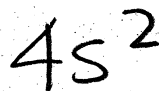
26. Draw, using x, y axes, a π bond.



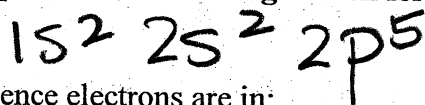
27. Write the complete electron configuration for bromine.



28. Write the **outer shell electron configuration** for *calcium*.



29. Write the **complete electron configuration** for *fluorine*.



30. How many valence electrons are in:

- a. Hydrogen 1
- b. Magnesium 2
- c. Carbon 4
- d. Chlorine 7
- e. Fluorine 7
- f. Neon 8
- g. Nitrogen 5
- h. Potassium 1

31. What is the *formula used* to calculate the **frequency of light**?

$$c = f \cdot \lambda$$

32. What is the **speed of light** (include units)?

$$c = 3.00 \times 10^8 \text{ m/sec}$$

33. What is the *formula used* to calculate the **energy of an photon**?

$$E = h \cdot f$$

34. What is **Planck's constant**?

$$h = 6.63 \times 10^{-34} \text{ J}\cdot\text{sec}$$

35. Put these electromagnetic radiations in order from LOWEST to HIGHEST energy. Put 1 for lowest and 7 for highest.

Gamma waves 7

Radio waves 1

Visible light 4

Ultraviolet light 5

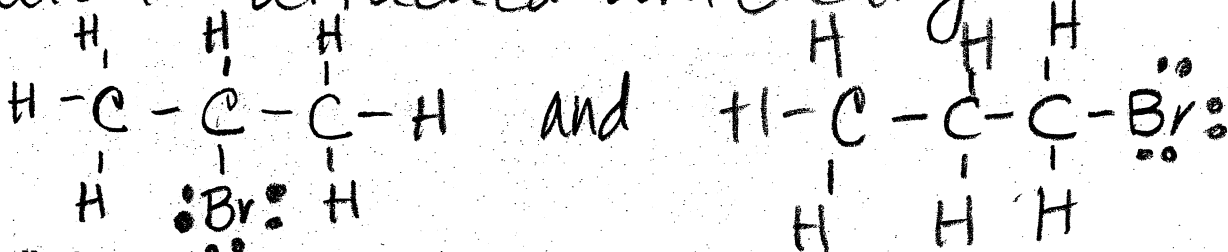
Infrared light 3

X rays 6

Microwaves 2

36. What is an isomer? Draw examples of several isomers for the same chemical formula.

same chemical formula but w/ atoms attached differently



37. What is an alloy? Give several examples and what metals make up each alloy.

mixture of metals

bronze, stainless steel, 14K gold

38. Who is Heisenberg and why is he important?

uncertainty principle - more you know about electron's velocity, the less you know about its location

39. What is resonance? Draw an example of resonant structures.

nitrate ion

