

Exam II – Chapters 5, 6, 7, and 12

1. (10 pts) Match the correct scientist with their discovery:

Rutherford

Thompson

Bohr

Dalton

Plank

- _____ a. Electron orbits were a fixed distance from the nucleus and had a definite energy.
- _____ b. Negatively charged electrons were distributed about a tiny, dense, positively charged nucleus.
- _____ c. Proposed that energy was emitted in small bundles called photons.
- _____ d. Atoms are homogeneous spheres of positive charge with small negative particles (electrons) throughout.
- _____ e. Proposed that an element is composed of tiny, indivisible, indestructible particles.

2. (3 pts) Circle the element in each of the following pairs with the greater metallic character:

Mg or Ba

K or As

Fe or Cu

3. (3 pts) Circle the element in each of the following pairs with the smallest atomic radius:

Li or Rb

Al or Ar

O or Se

4. (3 pts) Circle the element in each of the following pairs with the higher ionization energy:

Si or P

He or Xe

Li or F

5. (15 pts) Determine whether the following bonds are polar or nonpolar. For the ones that are **polar**, write the delta notation and polarity arrow above the atoms.

N-H

C-Cl

N-N

C-O

H-F

circle one:

P / NP

P / NP

P / NP

P / NP

P / NP

6. (3 pts) Write the full electron configuration for a potassium atom.

7. (3 pts) Write the noble gas configuration for a silicon atom.

8. (20 pts) Please circle the type of bond and name/write the formula for the following:

<u>Type of Bond</u>	<u>Chemical</u>	<u>Name or Formula</u>
ionic or covalent	Ag ₂ O	_____
ionic or covalent	sulfuric acid	_____
ionic or covalent	lead (II) carbonate	_____
ionic or covalent	S ₂ O ₄	_____
ionic or covalent	Mg(C ₂ H ₃ O ₂) ₂	_____
ionic or covalent	copper (II) hydroxide	_____
ionic or covalent	Na ₃ P	_____
ionic or covalent	NO ₃	_____
ionic or covalent	calcium permanganate	_____
ionic or covalent	diphosphorus trichloride	_____

9. (13 pts) Complete the following table:

Isotope	Mass Number	Atomic Number	Protons	Electrons	Neutrons
chlorine-37					
			47		60
	131			54	

10. (3 pts) The bonds between C-O in CO₂ are

- a. ionic b. polar covalent c. nonpolar covalent d. metallic

11. (3 pts) The bonds between Na-O in Na₂O are

- a. ionic b. polar covalent c. nonpolar covalent d. metallic

12. (3 pts) The bonds between Zn atoms in solid zinc are

- a. ionic b. polar covalent c. nonpolar covalent d. metallic

13. (3 pts) Considering yellow and violet light, which has the lower energy?

- a. yellow b. violet

16. (5 pts each) Please draw the correct Lewis Dot Structure for the following and answer the questions that follow:

a. C IO_3^-

Molecular Shape: _____ Bond Angle: _____ Polar Molecule? YES NO

b. C HBr_3

Molecular Shape: _____ Bond Angle: _____ Polar Molecule? YES NO

c. O F_2

Molecular Shape: _____ Bond Angle: _____ Polar Molecule? YES NO

Extra Credit: (5 pts)

Write a balanced chemical equation for the reaction of (including physical states!)

Solid calcium reacts with oxygen gas to form solid calcium oxide.