

Exam II – Chapters 5, 6, 7, and 12

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

Rutherford

Thompson

Bohr

Dalton

Plank

Bohr a. Electron orbits were a fixed distance from the nucleus and had a definite energy.

Rutherford b. Negatively charged electrons were distributed about a tiny, dense, positively charged nucleus.

Plank c. Proposed that energy was emitted in small bundles called photons.

Thompson d. Atoms are homogeneous spheres of positive charge with small negative particles (electrons) throughout.

Dalton 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

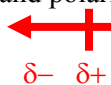
4. (3 pts) Circle the element in each of the following pairs with the higher ionization energy:

Si or **P**

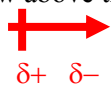
He or Xe

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.

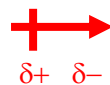


N-H

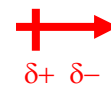


C-Cl

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	silver oxide
ionic or covalent	sulfuric acid	H ₂ SO ₄ (aq)
ionic or covalent	lead (II) carbonate	PbCO ₃
ionic or covalent	S ₂ O ₄	disulfur tetroxide
ionic or covalent	Mg(C ₂ H ₃ O ₂) ₂	magnesium acetate
ionic or covalent	copper (II) hydroxide	Cu(OH) ₂
ionic or covalent	Na ₃ P	sodium phosphide
ionic or covalent	NO ₃	nitrogen trioxide
ionic or covalent	calcium permanganate	Ca(MnO ₄) ₂
ionic or covalent	diphosphorus trichloride	P ₂ Cl ₃

9. (13 pts) Complete the following table:

Isotope	Mass Number	Atomic Number	Protons	Electrons	Neutrons
chlorine-37	37	17	17	17	20
¹⁰⁷ Ag	107	47	47	47	60
¹³¹ Xe	131	54	54	54	77

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

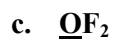
16. (5 pts each) Please draw the correct Lewis Dot Structure for the following and answer the questions that follow:



Molecular Shape: **trigonal pyramid** Bond Angle: **< 109.5°** Polar Molecule? **YES** NO



Molecular Shape: **tetrahedral** Bond Angle: **109.5°** Polar Molecule? **YES** NO



Molecular Shape: **bent** Bond Angle: **< 109.5°** 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.