

KEEP YOUR WORK AND ANSWERS COVERED.

1. (24 pts) Indicate whether each statement is true (T) or false (F). Be certain T or F is clearly indicated.

F Yellow light has a lower energy than red light.

T Neon signs emit photons due to relaxations.

F The $n = 3$ shell has $l = 0, 1, 2, 3$.

T Spin exclusion does not apply to a He atom.

T Shielding decreases the attraction of an outer shell electron for the nucleus.

F For every element, $IE_1 > IE_2$.

F The first ionization of sodium involves removal of a core electron.

T No d -subshell can have six unpaired electrons.

- ** 2. (3 pts) What neutral atom in Period 3 has three valence electrons? Al

(3 pts) What element in Period 3 has the greatest desire for another electron? Cl

(3 pts) What element has the largest atomic size in Period 4? K

- ** 3. (4 pts) How many valence and core electrons are in each of the following?

Ca valence: 2 core: 18

Pb valence: 4 core: 78

4. (6 pts) Consider the following elements.

Cs Ba In Xe Bi

Which one has the largest ionization energy? Xe

How many have diamagnetic atoms? 2

How many have atoms with two unpaired electrons? 0

5. (2 pts) How many elements have three valence electrons in the $n = 2$ shell?

1

(2 pts) How many elements in Period 2 have two unpaired electrons in a neutral atom?

2

(2 pts) Give the formula of one anion which is isoelectronic to K^+ .

 P^{3-} , S^{2-} or Cl^-

** 6. (4 pts) Of the following, circle the one which is largest.

Kr

Rb⁺I⁻

Br

Xe

Cs⁺

7. (6 pts) How many unpaired electrons are in each of the following?

Po²⁻ 0Ge 2Au³⁺ 2

8. (10 pts) Using noble gas abbreviation, give the configuration of each of the following.

Te²⁻ [Xe]Hg [Xe] 6s² 4f¹⁴ 5d¹⁰Ti²⁺ [Ar] 3d²

** 9. (3 pts) How many subshells are in the $n = 6$ shell?

6

(3 pts) What element forms a 2+ cation whose configuration ends in $4d^6$?

Ru