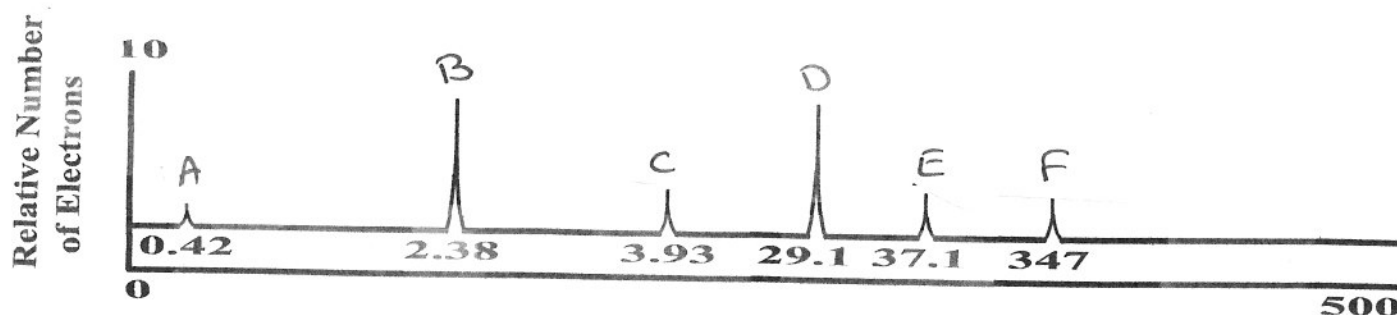


PES questions

Below is the full photoelectron spectroscopy for potassium (K). Use the spectrum to answer questions #1-4.



Peaks B and D are six times larger than A and three times larger than C, E and F.

1. The peaks labeled B and D are six times taller than the peak labeled A. Which of the following is the best explanation for this observation?

- A. Peaks B and D are indicative of transitions for 6 electrons whereas Peak A is a transition of only 1 electron.
- B. Peaks B and D are indicative of transitions for 1 electron whereas Peak A is a transition of 6 electrons.
- C. It requires six times as much energy for the electrons in Peaks B and D as it does for Peak A.
- D.

2. Which peak represents the binding energy of the electrons in the 2s orbital?

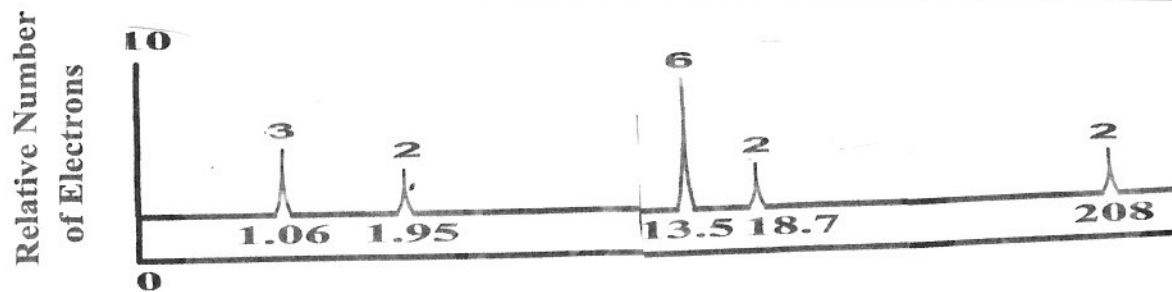
- A. A
- B. B
- C. C
- D. E

3. Calcium follows Potassium on the periodic table. If the PES for Ca were given, how would it be different from the one for K?

- A. Peak A would be twice as large as it is for K
- B. A new peak would be formed next to Peak A that would be the same height as A
- C. A new peak would be formed next to A that would be six times the height of A.
- D. A new peak would be formed next to F that would be the same height as A.

4. A specific amount of energy will be applied to an atom of Potassium. An electron from which peak would require the most energy to remove?

- A. A
- B. B
- C. F
- D. Impossible to tell



5. Above is a photoelectron spectrum for an element. Using your knowledge of PES, How many unpaired electrons are shown in the PES?

A. 6

B. 2

C. 3

D. 5

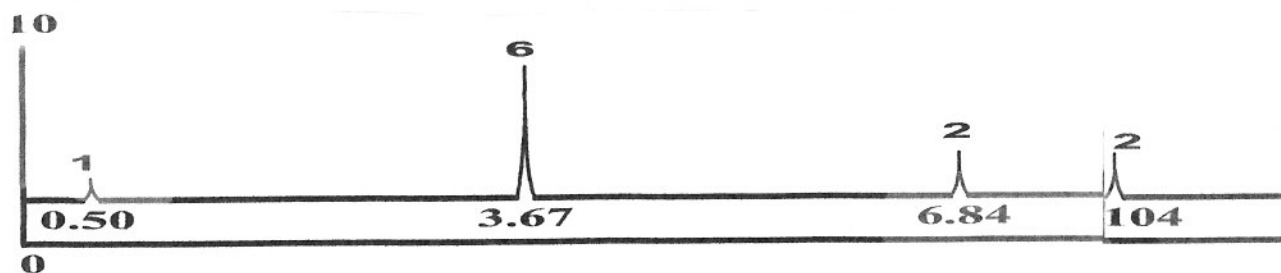
6. Using the same PES as #5, identify the element.

A. B

B. N

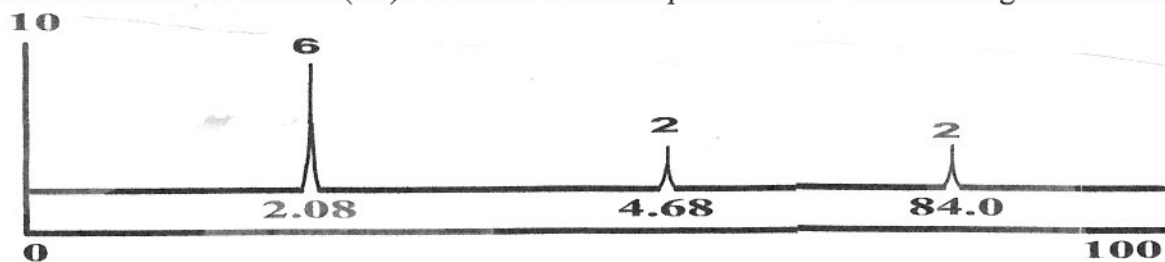
C. P

D. Cl

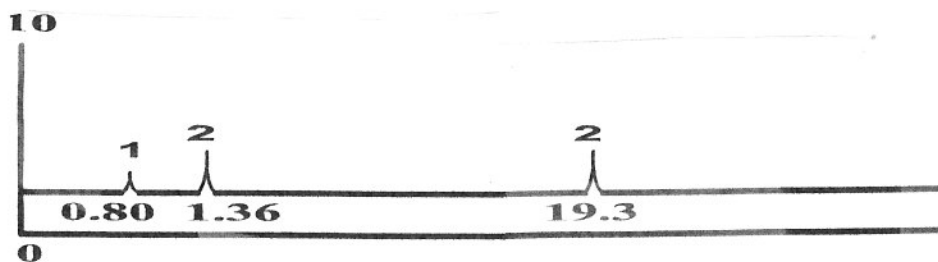


7. Above is the PES for sodium (Na). Which of the PES spectra below would belong to the same family as Na?

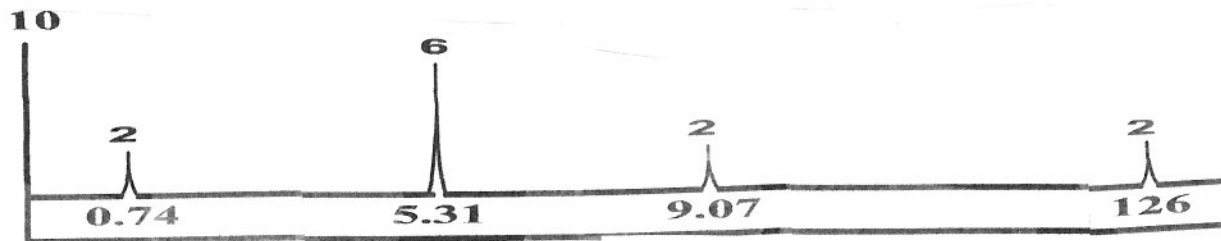
A.



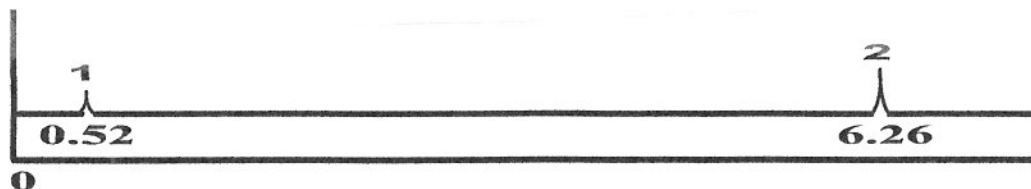
B.



C.



D.



8. Which of the PES given in #7 would have the lowest ionization energy for its outermost valence electron?

- A. A B. B C. C D. D

9. How many peaks would the PES for Chlorine have?

- A. 17 B. 5 C. 7 D. 1

10. What does a relatively low value of energy tell you about the relative position of the electrons within *any* atom?

11. What does the relative height of any peak tell you about the relative numbers of electrons present in that sublevel?