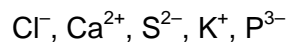


From textbook: Chapter 3: 71, 73,79,81, 85, 93, 97, 99, 111, 113, 115, 133 and 135

Chapter 4: 17, 23, 25, 27,29, 31, 33, 35, 41, 43, 47, 49, 55, 57, 61, 63, 67, 69, 75, 77, 79, 83  
85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109 and 111

1. What is the ground-state electron configuration of an aluminum atom?
2. What is the ground-state electron configuration of a bromine atom?
3. What is the ground-state electron configuration of a cobalt atom?
4. What is the ground-state electron configuration of a chromium atom?
5. How many unpaired electrons are there in the ground state of the ion  $\text{Cu}^+$ ?  
A. 5                      B. 1                      C. 6                      D. 3                      E. 0
6. What is the electron configuration of the  $\text{Se}^{2-}$  ion?
7. What ion would have the ground-state electron configuration  $[\text{Ar}]3d^{10}$ .
8. Which of the following atoms has the greatest number of valence-shell electrons?  
A. chlorine                      B. arsenic                      C. sulfur  
D. lead                      E. barium
9. Which of the following atoms would have the smallest radius?  
A. oxygen                      B. sulfur                      C. carbon  
D. silicon                      E. lithium
10. Which of the following species has the smallest radius?  
A.  $\text{Cl}^-$                       B.  $\text{S}^{2-}$                       C.  $\text{K}^+$                       D. K                      E.  $\text{Ca}^{2+}$
11. Which of the following species has the largest radius?  
A. S                      B.  $\text{Ca}^{2+}$                       C.  $\text{Cl}^-$                       D.  $\text{K}^+$                       E.  $\text{S}^{2-}$
12. Arrange  $\text{Cl}^-$ ,  $\text{Al}^{3+}$ , and  $\text{Ca}^{2+}$  in order of increasing ionic radii.  
A.  $\text{Al}^{3+} < \text{Ca}^{2+} < \text{Cl}^-$   
B.  $\text{Cl}^- < \text{Ca}^{2+} < \text{Al}^{3+}$   
C.  $\text{Ca}^{2+} < \text{Cl}^- < \text{Al}^{3+}$   
D.  $\text{Ca}^{2+} < \text{Cl}^- < \text{Al}^{3+}$   
E.  $\text{Ca}^{2+} < \text{Al}^{3+} < \text{Cl}^-$
13. Which of the following has the highest first ionization energy?  
A. P                      B. Mg                      C. S                      D. Al                      E. Si
14. Which of the following has the highest first ionization energy?  
A. oxygen                      B. sulfur                      C. iodine                      D. cesium                      E. boron

15. Metallic elements
- do not react with acids.
  - have low ionization energies.
  - have high ionization energies.
  - have electron affinities higher than fluorine.
  - form covalent halides.
16. Which of the following represents the second ionization energy of the element E?
- $E(s) \rightarrow E^+(g) + e^-(g)$
  - $E(s) \rightarrow E^{2+}(g) + 2e^-(g)$
  - $E^+(g) \rightarrow E^{2+}(g) + e^-(g)$
  - $E(g) \rightarrow E^+(g) + e^-(g)$
  - $E(g) \rightarrow E^{2+}(g) + 2e^-(g)$
17. Which of the following processes, with all species in the gas phase, would require the most energy?
- $Mg \rightarrow Mg^+ + e^-$
  - $Mg \rightarrow Mg^{2+} + 2e^-$
  - $Mg^{2+} \rightarrow Mg^{3+} + e^-$
  - $Mg^+ \rightarrow Mg^{2+} + e^-$
  - $K \rightarrow K^+ + e^-$
18. Which of the following ions would least likely form?
- $Se^{2-}$
  - $Fe^{2+}$
  - $Be^{2+}$
  - $Si^{2+}$
  - $F^{2-}$
19. Which of the following has the largest electron affinity?
- $F^-$
  - $F$
  - $O^-$
  - $O$
  - $N$
20. A 4s-electron in the potassium atom is lower in energy than a 3d-electron due to
- the shapes of the 3d-orbitals.
  - the fact that there are five 3d-orbitals.
  - a low ionization energy of potassium.
  - penetration and shielding.
  - the relative sizes of the 4s- and 3d-orbitals.
21. Which of the following is a p-block element?
- arsenic
  - calcium
  - vanadium
  - copper
  - potassium
22. Explain what is meant by an isoelectronic series. Which of the following species has the largest ionic radius?



### Answers

- |                   |                           |                    |                    |       |
|-------------------|---------------------------|--------------------|--------------------|-------|
| 1. $[Ne]3s^23p^1$ | 2. $[Ar] 4s^23d^{10}4p^5$ | 3. $[Ar] 4s^23d^7$ | 4. $[Ar] 4s^13d^5$ | 5. E  |
| 6. $[Kr]$         | 7. $Zn^{2+}$ or $Cu^{+1}$ | 8. A               | 9. A               | 10. E |
| 11. E             | 12. A                     | 13. C              | 14. A              | 15. B |
| 16. C             | 17. C                     | 18. E              | 19. B              | 20. D |
| 21. A             |                           |                    |                    |       |

22. Species with the same number of atoms and the same number of valence electrons are termed isoelectronic. The ion  $P^{3-}$  has the largest ionic radius