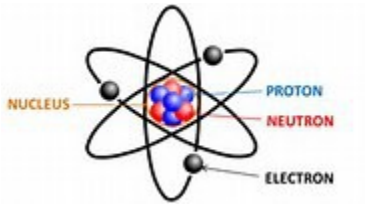
AP Chem CQ

Atomic Structure/Periodicity Practice



1. Glowing gas in an enclose tube is called a _____ or _____ tube. How do cathode rays move in a voltaic cell?
2. What is important about R. Millikan and his discovery in the early 1900's?
3. How does the mass of the three subatomic particles compare?
4. Why isn't the atomic mass of each element a whole number?
5. Why did Bohr think that Rutherford's model of the atom was incomplete?
6. What is a photon? What is the equation to solve for the energy of light?
7. Define CONTINUOUS SPECTRUM.
8. When would you see a line spectrum?
9. How many different principal quantum numbers can be found in the ground-state electron configuration of nickel?
10. The 3p subshell in the ground state of atomic xenon contains how many electrons?

<u>Use these answers for questions 11-13</u>

A) O B) La C) Rb D) Mg E) N

11. What is the most electronegative element of the above?
12. Which element exhibits the greatest number of different oxidation states?
13. Which of the elements above has the smallest radius for its most commonly found ion?

<u>Use these answers for questions 14-17</u>

A) $1s^2\ 2s^2\ 2p^5\ 3s^2\ 3p^5$
B) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$
C) $1s^2\ 2s^2\ 2p^6\ 2d^{10}\ 3s^2\ 3p^6$
D) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^5$
E) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^2$

14. An impossible electronic configuration
15. The ground-state configuration for the atoms of a transition element
16. The ground state configuration of a negative ion of a halogen
17. The ground state configuration of a common ion of an alkaline earth element
18. Is there a difference between stating, "The electron is located at a particular point in space" and There is a high probability that the electron is located at a particular point in space?

19. What is the difference between an orbit (Bohr model) and an orbital (quantum mechanical model)?

20. Predict the number of subshells in the fourth shell, n=4. Give the label for each of these subshells. How many orbitals are in each of these subshells?

21. Which would you expect to experience a greater effective nuclear charge (Z_{eff}) a 2 p electron of a Ne atom or a 3s electron of a Na atom?

22. Arrange the following atoms in order of increasing size. P, S, As, Se

23. Arrange these atoms and ions in order of decreasing size: Mg^{+2} , Ca^{+2}, & Ca

24. Arrange the ions in order of decreasing size: K+, Cl-, Ca^{+2}, & S^{-2} (isoelectronic series)

25. Which of the 2 processes, would require shorter wavelength radiation (Light can be used to ionize atoms and ions as in the above 2 questions)

26. Arrange in order of increasing first ionization energy; Na, Ne, P Ar, K

27. Write the electron configuration for A) Ca^{+2} B) Co^{+3} C) S^{-2}

28. Suppose you were asked to a value for the first ionization energy of a Cl- (g) ion. What is the relationship between the quantity and the electron affinity of Cl(g)?

29. Would you expect scandium oxide to be a solid, liquid, or gas at room temperature? Write the balanced chemical equation for the reaction of scandium oxide with nitric acid.

30. A compound ACl_3 (A is an element) has a melting point of -112 deg C. Would you expect the compound to be a molecular or ion substance? If you were told that element A was either Sc or P, which do you think would be a more likely choice?

31. Write a balanced equation that predicts the reaction of potassium metal with A) $Cl_2(g)$, B) H_2O (l), C) $H_2(g)$