CHEM 1310 General Chemistry: Atomic structure

1. The Bohr model of the atom is which of the following?

A. A model in which electrons orbit the nucleus in discrete shells

B. A model in which electrons orbit the nucleus in a continuous cloud

C. A model in which the nucleus is surrounded by a cloud of electrons

D. A model in which electrons are located in specific orbitals around the nucleus

2. In the Bohr model of the atom, the energy of an electron is determined by which of the following?

A. The mass of the electron

B. The speed of the electron

C. The distance of the electron from the nucleus

D. The charge of the electron

3. In the Bohr model of the atom, an electron can move from one energy level to another by which of the following?

A. Absorbing or emitting a photon

B. Gaining or losing an electron

C. Increasing or decreasing its speed

D. Moving closer to or further away from the nucleus

4. The quantum mechanical model of the atom is which of the following?

A. A model in which electrons orbit the nucleus in discrete shells

B. A model in which electrons orbit the nucleus in a continuous cloud

C. A model in which the nucleus is surrounded by a cloud of electrons

D. A model in which electrons are located in specific orbitals around the nucleus

5. In the quantum mechanical model of the atom, the energy of an electron is determined by which of the following?

A. The mass of the electron

B. The speed of the electron

C. The distance of the electron from the nucleus

D. The charge of the electron

6. In the quantum mechanical model of the atom, an electron can move from one energy level to another by which of the following?

A. Absorbing or emitting a photon

B. Gaining or losing an electron

C. Increasing or decreasing its speed

D. Moving closer to or further away from the nucleus

7. The wave-particle duality of electrons refers to which of the following?

A. The fact that electrons can behave as both particles and waves

B. The fact that electrons are both particles and waves

C. The fact that electrons are neither particles nor waves

D. The fact that electrons can neither be particles nor waves

8. The Heisenberg uncertainty principle states which of the following?

A. It is impossible to know both the position and momentum of an electron simultaneously

B. It is impossible to know the position of an electron

C. It is impossible to know the momentum of an electron

D. It is impossible to know the position and momentum of an electron

9. In the quantum mechanical model of the atom, the electrons do not orbit the nucleus in discrete shells but instead occupy which of the following?

A. Probability clouds

B. Energy levels

C. Electron orbitals

D. Atomic orbitals

10. The ground state of an atom is which of the following?

A. The lowest energy state of an atom

B. The highest energy state of an atom

C. The most stable state of an atom

D. The least stable state of an atom

11. An excited state of an atom is which of the following?

A. The lowest energy state of an atom

B. The highest energy state of an atom

C. The most stable state of an atom

D. The least stable state of an atom

12. The electron configuration of an atom is which of the following?

A. The way in which the electrons are arranged around the nucleus

B. The way in which the protons are arranged around the nucleus

C. The way in which the neutrons are arranged around the nucleus

D. The way in which the nucleons are arranged around the nucleus

13. The Pauli exclusion principle states which of the following?

A. No two electrons in an atom can have the same set of quantum numbers

B. No two electrons in an atom can occupy the same orbital

C. No two electrons in an atom can have the same energy

D. No two electrons in an atom can have the same spin

14. Hund's rule states which of the following?

A. Electrons occupy orbitals of the lowest energy first

B. Electrons occupy orbitals of the highest energy first

C. Electrons occupy orbitals of equal energy in pairs

D. Electrons occupy orbitals of equal energy singly

15. The aufbau principle states which of the following?

A. Electrons occupy orbitals of the lowest energy first

B. Electrons occupy orbitals of the highest energy first

C. Electrons occupy orbitals of equal energy in pairs

D. Electrons occupy orbitals of equal energy singly

16. The orbital filling order for the orbitals of the first four elements is which of the following?

A. 1s, 2s, 2p, 3s

B. 1s, 2s, 2p, 3p

C. 1s, 2s, 2p, 3d

D. 1s, 2s, 2p, 4s

17. The shapes of atomic orbitals are determined by which of the following?

A. The energy of the orbital

B. The angular momentum of the orbital

C. The spin of the orbital

D. The magnetic quantum number of the orbital

18. The s orbitals are which of the following?

A. Spherical

B. Dumbbell-shaped

C. Angular

D. Lobed

19. The p orbitals are which of the following?

A. Spherical

B. Dumbbell-shaped

C. Angular

D. Lobed

20. The d orbitals are which of the following?

A. Spherical

B. Dumbbell-shaped

C. Angular

D. Lobed

21. The f orbitals are which of the following?

A. Spherical

B. Dumbbell-shaped

C. Angular

D. Lobed

22. The valence electrons are which of the following?

A. The electrons in the outermost energy level of an atom

B. The electrons in the innermost energy level of an atom

C. The electrons in the outermost orbital of an atom

D. The electrons in the innermost orbital of an atom

23. The core electrons are which of the following?

A. The electrons in the outermost energy level of an atom

B. The electrons in the innermost energy level of an atom

C. The electrons in the outermost orbital of an atom

D. The electrons in the innermost orbital of an atom

24. The atomic number of an element is which of the following?

A. The number of protons in the nucleus of an atom

B. The number of electrons in the nucleus of an atom

C. The number of neutrons in the nucleus of an atom

D. The number of nucleons in the nucleus of an atom

25. The mass number of an element is which of the following?

A. The number of protons in the nucleus of an atom

B. The number of electrons in the nucleus of an atom

C. The number of neutrons in the nucleus of an atom

D. The number of nucleons in the nucleus of an atom

1. A
2. C
3. A
4. D
5. D
6. A
7. A
8. A
9. C
10. A
11. D
12. A
13. A
14. A
15. A
16. A
17. A
18. A
19. C
20. D
21. D
22. A
23. D
24. A
25. D