

1. An atom with the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$ has an incomplete

- A. 2p sublevel
- B. Second principal energy level
- C. Third principal energy level
- D. 4s sublevel

2. What is the total number of electrons in a completely filled fourth principal level?

- A. 8
- B. 10
- C. 16
- D. 32

3. The characteristic bright line spectrum of an element is produced when its electrons

- A. Form a covalent bond
- B. Form an ionic bond
- C. Move to a higher energy state
- D. Move to a lower energy state

4. Which emanation has no mass and no charge?

- A. Alpha
- B. Beta
- C. Gamma
- D. Neutron

5. In which system do molecule-ion attractions exist?

- A. NaCl(aq)
- B. NaCl(s)
- C. C₆H₁₂O₆(aq)
- D. C₆H₁₂O₆(s)

6. A particle accelerator can increase the kinetic energy of

- A. An alpha particle and a beta particle
- B. An alpha particle and a neutron
- C. A gamma ray and a beta particle
- D. A neutron and a gamma ray

7. What is the total number of electrons needed to completely fill all of the orbitals in an atom's second principal energy level?

- A. 16
- B. 2
- C. 8
- D. 4

8. An atom in an excited state can have an electron configuration of

- A. $1s^2 2s^2$
- B. $1s^2 2p^1$
- C. $1s^2 2p^2$
- D. $1s^2 2s^2 2p^5$
- E. $1s^2 2s^2 2p^6$

9. Compared to the charge and mass of a proton an electron has

- A. The same charge and smaller mass
- B. The same charge and the same mass
- C. The opposite charge and smaller mass
- D. The opposite charge and the same mass

10. What is the total number of sublevels in the fourth principal energy level?

- A. 1
- B. 2
- C. 3
- D. 4

11. Which atom in the ground state has only one unpaired electron in its valence shell?

- A. Aluminum
- B. Silicon
- C. Phosphorus
- D. Sulfur

12. The shape and bonding of a diatomic bromine molecule are best described as

- A. Symmetrical and polar
- B. Symmetrical and nonpolar
- C. Asymmetrical and polar
- D. Asymmetrical and nonpolar

13. What is the oxidation number of sulfur in H_2SO_4 ?

- A. 0
- B. -2
- C. +6
- D. +4

14. When alpha particles are used to bombard gold foil, most of the alpha particles pass through undeflected. This result indicates that most of the volume of gold atom consists of

- A. Neutrons
- B. Protons
- C. Deuterons
- D. Unoccupied space

15. When an alpha particle is emitted by an atom, the atomic number of the atom will

- A. Decrease by 2
- B. Increase by 2
- C. Decrease by 4
- D. Increase by 4

16. Which of the following element has the corresponding valence subshell of $3p^4$? Atomic numbers are listed next to the elements.

- A. Aluminum 13
- B. Silicon 14
- C. Sulfur 16
- D. Chlorine 17

17. Which of the following element has the corresponding valence subshell of $3p^6$? Atomic numbers are listed next to the elements.

- A. Sulfur 16
- B. Chlorine 17
- C. Argon 18
- D. Potassium 19

18. Which of the following element has the corresponding valence subshell of $3s^1$? Atomic numbers are listed next to the elements.

- A. Neon 10
- B. Sodium 11
- C. Magnesium 12
- D. Aluminum 13

19. Which of the following element has the corresponding valence subshell of $2p^4$? Atomic numbers are listed next to the elements.

- A. Nitrogen 7
- B. Oxygen 8
- C. Neon 10
- D. Magnesium 12

20. What is the maximum number of electrons that can be found in the orbital denoted by the letter f?

- A. 10
- B. 14
- C. 16
- D. 18

Answer Key

- 1. C
- 2. D
- 3. D
- 4. C
- 5. A

6. A

7. C

8. B

9. C

10. D

11. A

12. B

13. C

14. D

15. A

16. C

17. C

18. B

19. B

20. B