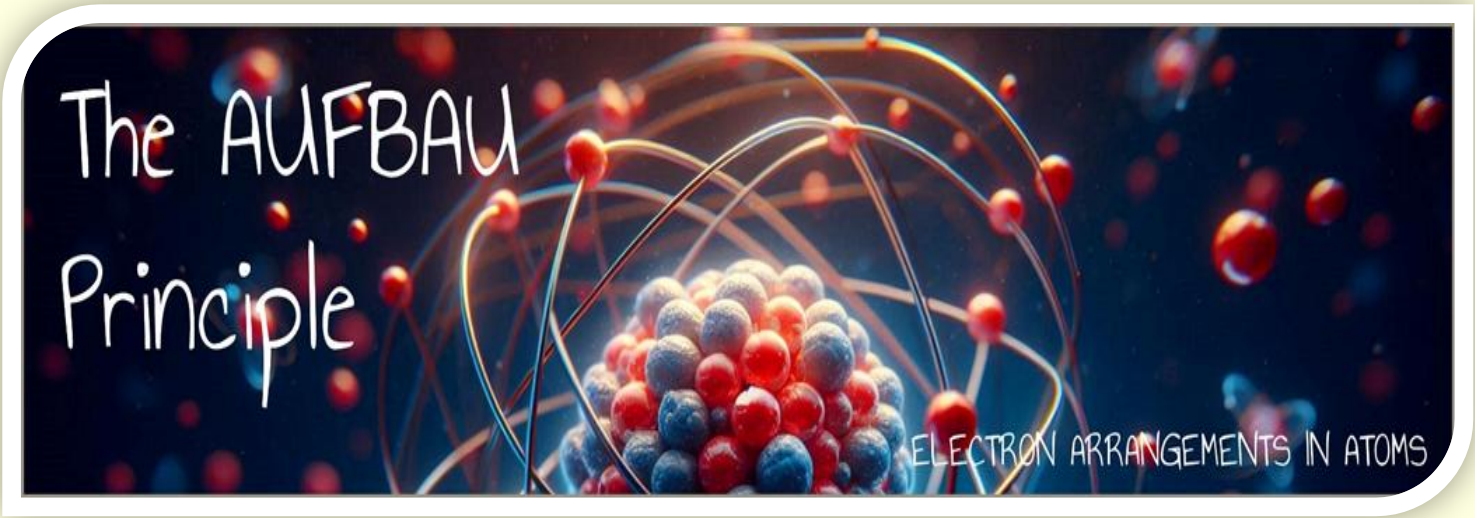

Answer all the questions below as fully as you can then check your answers

1. What does the Aufbau principle state?

A) Electrons fill the highest energy orbitals first.

B) Electrons fill the lowest energy orbitals first.

C) Electrons must pair up in orbitals before moving to the next.

D) Electrons are randomly placed in orbitals.

2. Which of the following is the correct electron configuration for oxygen (O, Z=8)?

A) $1s^2\ 2s^2\ 2p^6$ B) $1s^2\ 2s^2\ 2p^4$ C) $1s^2\ 2s^2\ 2p^3$ D) $1s^2\ 2p^6$

3. In an electron energy level diagram, which orbital is filled immediately after 3p?

A) 4p B) 4s C) 3d D) 5s

4. The electron configuration of Argon (Ar, Z=18) in shorthand notation is:

A) [Ne] $3s^2$ $3p^6$

B) [Ne] $3s^2$ $3p^5$

C) [Ar] $3s^2$ $3p^6$

D) [Ar]

5. Which element has the electron configuration [Kr] $5s^1$ $4d^5$?

A) Chromium (Cr) B) Copper (Cu) C) Molybdenum (Mo)

D) Silver (Ag)

6. According to Hund's rule, electrons must:

A) Fill orbitals singly before pairing up. B) Fill the lowest energy orbital first.

C) Pair up in an orbital with the same spin. D) Be randomly distributed in orbitals.

7. The electron configuration for Copper (Cu, Z=29) is:

A) [Ar] $4s^2$ $3d^9$ B) [Ar] $4s^1$ $3d^{10}$ C) [Ar] $4s^2$ $3d^{10}$ D) [Ar] $4s^1$ $3d^9$

8. Which block in the periodic table contains elements with their last electron entering a d-orbital?

A) s-block B) p-block C) d-block D) f-block

9. What is the correct order of filling for these orbitals?

A) 3s, 3p, 3d, 4s B) 3s, 4s, 3p, 3d C) 3s, 3p, 4s, 3d

D) 3s, 4p, 3d, 4s

10. Which of the following elements is found in the s-block?

A) Helium (He) B) Carbon (C) C) Iron (Fe) D) Neon (Ne)

11. Which rule states that no two electrons in the same atom can have identical sets of four quantum numbers?

A) Hund's rule B) Aufbau principle

C) Pauli exclusion principle D) Heisenberg uncertainty principle

12. The electron configuration of Scandium (Sc, Z=21) is:

A) [Ar] $4s^2$ $3d^1$ B) [Ar] $3d^3$ C) [Ar] $4s^1$ $3d^2$ D) [Ne] $3s^2$ $3p^6$ $3d^1$

13. What is the electron configuration for Titanium (Ti, Z=22)?

A) [Ar] $4s^1$ $3d^1$ B) [Ar] $4s^2$ $3d^2$ C) [Ar] $4s^2$ $3d^1$ $4p^1$ D) [Ar] $3d^4$

14. Which element has an anomalous electron configuration similar to Chromium?

A) Zinc (Zn) B) Iron (Fe) C) Copper (Cu) D) Nickel (Ni)

15. The p-block elements have their last electron enter which orbital?

A) s-orbital B) p-orbital C) d-orbital D) f-orbital

16. What is the ground-state electron configuration for Phosphorus (P, Z=15)?

A) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$ B) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$

C) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$ D) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 4s^3$

17. What principle dictates that electrons must occupy the lowest available energy level?

A) Hund's rule B) Pauli exclusion principle

C) Aufbau principle D) Heisenberg uncertainty principle

18. Which of the following is NOT a correct electron configuration?

A) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^1$ (for Cu) B) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^1$ (for Cr)

C) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2$ (for Zn) D) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8\ 4s^2$ (for Ni)

19. In the electron configuration of Nitrogen (N, Z=7), how many unpaired electrons are present?

A) 0 B) 1 C) 2 D) 3

20. Which of the following blocks of the periodic table is associated with elements that have their last electron enter an s-orbital?

A) s-block B) p-block C) d-block D) f-block

21. The Pauli Exclusion Principle is crucial in explaining:

A) The filling of orbitals in order of increasing energy.

B) The pairing of electrons with opposite spins in the same orbital.

C) The arrangement of electrons singly in degenerate orbitals.

D) The energy difference between 4s and 3d orbitals.

22. Which electron configuration represents the ground state of an element in the p-block?

A) [Ne] $3s^2$ $3p^1$ B) [Ar] $3d^{10}$ $4s^2$ $4p^1$ C) [Kr] $4d^{10}$ $5s^2$ $5p^1$ D) All of the above

23. Which element's electron configuration ends with $4s^2$ $3d^5$?

A) Manganese (Mn) B) Chromium (Cr)

C) Iron (Fe) D) Nickel (Ni)

24. What is the electron configuration of Vanadium (V, Z=23)?

A) [Ar] $4s^2$ $3d^1$ B) [Ar] $4s^2$ $3d^3$ C) [Ar] $3d^4$ D) [Ar] $4s^1$ $3d^4$

Answers

1. What does the Aufbau principle state?

Answer: B

2. Which of the following is the correct electron configuration for oxygen (O, Z=8)?

Answer: B

3. In an electron energy level diagram, which orbital is filled immediately after 3p?

Answer: B

4. The electron configuration of Argon (Ar, Z=18) in shorthand notation is:

Answer: D

5. Which element has the electron configuration [Kr] $5s^1$ $4d^5$?

Answer: C

6. According to Hund's rule, electrons must:

Answer: A

7. The electron configuration for Copper (Cu, Z=29) is:

Answer: B

8. Which block in the periodic table contains elements with their last electron entering a d-orbital?

Answer: C

9. What is the correct order of filling for these orbitals?

Answer: C

10. Which of the following elements is found in the s-block?

Answer: A

11. Which rule states that no two electrons in the same atom can have identical sets of four quantum numbers?

Answer: C

12. The electron configuration of Scandium (Sc, Z=21) is:

Answer: A

13. What is the electron configuration for Titanium (Ti, Z=22)?

Answer: B

14. Which element has an anomalous electron configuration similar to Chromium?

Answer: C

15. The p-block elements have their last electron enter which orbital?

Answer: B

16. What is the ground-state electron configuration for Phosphorus (P, Z=15)?

Answer: B

17. What principle dictates that electrons must occupy the lowest available energy level?

Answer: C

18. Which of the following is NOT a correct electron configuration?

Answer: D

19. In the electron configuration of Nitrogen (N, Z=7), how many unpaired electrons are present?

Answer: D

20. Which of the following blocks of the periodic table is associated with elements that have their last electron enter an s-orbital?

Answer: A

21. The Pauli Exclusion Principle is crucial in explaining:

Answer: B

22. Which electron configuration represents the ground state of an element in the p-block?

Answer: D

23. Which element's electron configuration ends with $4s^2\ 3d^5$?

Answer: A

24. What is the electron configuration of Vanadium (V, Z=23)?

Answer: B