



Quantum numbers-2

Atomic Structure -15 (Shapes of Orbitals & Nodes)

I'm always going to believe in myself. That's the one thing that will never change." — Naruto

Even if the world doubts you... don't stop believing in yourself. That is your real strength.

- The number of radial nodes in a 3p orbital is:**
 - 0
 - 1
 - 2
 - 3
- For a given orbital, the total number of nodes is given by:**
 - $n - 1$
 - l
 - $n + l$
 - $n - l - 1$
- Which of the following orbitals has spherical shape?**
 - 2p
 - 3d
 - 4s
 - 4f
- Number of angular nodes in 4d orbital is:**
 - 0
 - 2
 - 3
 - 4
- The dumbbell-shaped orbitals are:**
 - s
 - p
 - d
 - f
- Total number of nodes in 4f orbital is:**
 - 3
 - 4
 - 5
 - 6
- Radial nodes are absent in:**
 - 1s
 - 2s
 - 3p
 - 3d

8. **The number of lobes in a p-orbital is:**
(A) 1
(B) 2
(C) 3
(D) 4
9. **The number of nodal planes in d_{xy} orbital is:**
(A) 0
(B) 1
(C) 2
(D) 3
10. **The number of angular nodes in 5p orbital is:**
(A) 0
(B) 1
(C) 2
(D) 3
11. **Which orbital has 2 radial nodes and 2 angular nodes?**
(A) 4p
(B) 4d
(C) 4f
(D) 5d
12. **Shape of d_{z^2} orbital is often described as:**
(A) Dumbbell
(B) Double dumbbell
(C) Dumbbell with doughnut
(D) Spherical
13. **For 2s orbital, the number of radial nodes is:**
(A) 0
(B) 1
(C) 2
(D) 3
14. **Which orbital has 3 angular nodes?**
(A) 3p
(B) 4d
(C) 5f
(D) 6s
15. **The angular node depends upon:**
(A) n
(B) l
(C) m
(D) $n - l$
16. **The shape of f-orbitals is:**
(A) Spherical
(B) Dumbbell
(C) Complex
(D) Linear
17. **Which orbital will have highest number of radial nodes?**
(A) 3p
(B) 4s

- (C) 5d
(D) 6f
18. **Which orbital has no node at all?**
(A) 1s
(B) 2s
(C) 2p
(D) 3d
19. **The nodal plane in p_x orbital lies in:**
(A) yz-plane
(B) xz-plane
(C) xy-plane
(D) along x-axis
20. **For a 4p orbital, calculate the total number of nodes. If one of these nodes is angular, find the number of radial nodes.**
(A) 2 radial, 1 angular
(B) 3 radial, 1 angular
(C) 1 radial, 2 angular
(D) 2 radial, 2 angular
21. **Which orbital among 3d, 4p, 5s has the maximum total number of nodes?**
(A) 3d
(B) 4p
(C) 5s
(D) All equal
22. **For a hydrogen atom, the ratio of radial nodes to angular nodes in 5f orbital is:**
(A) 1:3
(B) 2:3
(C) 1:2
(D) 3:2
23. **Consider two orbitals: 2p and 3s. Which of the following is true?**
(A) Both have 1 radial node
(B) 3s has 1 more radial node than 2p
(C) 2p has 1 more angular node than 3s
(D) 3s has 2 more total nodes than 2p
24. **For $n = 6$, how many orbitals will have exactly 2 radial nodes?**
(A) 3
(B) 4
(C) 5
(D) 6
25. **Probability of finding electron at nucleus ($r = 0$) is zero for:**
(A) Only s-orbitals
(B) Only p-orbitals
(C) All orbitals with $l \neq 0$
(D) All orbitals
26. **The number of nodal planes for d_{xz} orbital is:**
(A) 0
(B) 1
(C) 2
(D) 3

27. Among 2s, 2p, 3s, and 3p orbitals, which has the largest number of radial nodes?
(A) 2s
(B) 3s
(C) 2p
(D) 3p
28. Which of the following orbitals has no angular nodes but two radial nodes?
(A) 2s
(B) 3s
(C) 4s
(D) 5s
29. The angular node for d_{z^2} orbital corresponds to:
(A) xy-plane
(B) z-axis
(C) Cone-shaped surfaces
(D) Spherical surface
30. If $n = 5$, find the maximum number of nodes possible in any orbital of this shell.
(A) 3
(B) 4
(C) 5
(D) 6
31. A hydrogen atom is in 3p orbital. Number of angular nodes and radial nodes respectively are:
(A) 1, 1
(B) 2, 0
(C) 1, 0
(D) 0, 2
32. Which orbital has the same number of radial and angular nodes?
(A) 3d
(B) 4p
(C) 4d
(D) 5f
33. If an orbital has 3 total nodes and 2 angular nodes, then quantum numbers (n, l) are:
(A) (3,2)
(B) (4,2)
(C) (3,1)
(D) (4,1)