Quantum Mechanical Model of Atom, Orbitals and Quantum Numbers

1. **According to Schrodinger model, nature of electron in an atom is as**

   1) Particles only 2) Wave only

   3) Both simultaneously 4) Sometimes waves and sometimes particles

2. **The quantum number not obtained from the Schrodinger's wave equation is**

   1) n 2) l 3) m 4) s

3. **The maximum probability of finding an electron of a particular energy in an orbital is about**

   1) 80% 2) 85% 3) 95% 4) 99%

4. **Radial part of the wave function depends on quantum numbers**

   1) n and s 2) l and m 3) l and s 4) n and l

5. **d-orbitals are --- degenerate**

   1) Two fold 2) Fivefold 3) Threefold 4) Four fold

6. **Maximum number of electrons that can be possible in N - shell is**

   1) 18 2) 8 3) 32 4) 50

7. **Number of nodal planes and radial nodes possible for a 3p-orbital are respectively**

   1) 0, 1 2) 1, 2 3) 2, 1 4)1, 1

8. **Which of the following is true for a 'p' orbital?**

   1) Dumbbell in shape 2) Has Directional Character

   3) Has 'm' value+1,-1 or 0 4) All

9. **The maximum number of electrons accommodated by 3d sublevel is**

   1) 2 2) 10 3) 6 4) 14

10. The nodal plane for P_x orbital is

1) ZX-plane 2) YZ-plane 3) XY-plane 4) Any One of these

11. Number of nodes in 3p orbital is same as in

1) 3s orbital 2) 3d orbital 3) 4p orbital 4) 4d orbital

12. Which d-orbital has its four lobes along the axes?

1) d_{xy} 2) $d_{x^2-y^2}$ 3) d_{z^2} 4) d_{xz}

13. In the radial probability distribution curve for the 2s orbital of the hydrogen atom, the minor maximum, the node and the major maximum occur at the following distances from the nucleus respectively

1) $1.1A^o, 0.53A^o, 2.6A^o$ 2) $0.53A^o, 1.1A^o, 2.6A^o$

3) $2.6A^o, 1.1A^o, 0.53A^o$ 4) $0.53A^o, 2.116A^o, 2.6A^o$

14. (A): There are two nodal regions in 3d- orbital.

(R): d-orbital is in double dumbbell shape.

The correct answer is

1) Both (A) and (R) are true and (R) is the correct explanation of (A).

2) Both (A) and (R) are true and (R) is not the correct explanation of (A).

3) (A) is true but (R) is not true.

4) (A) is not true but (R) is true.

15. For complete description of an electron in an atom, the number of quantum numbers required is

1) One 2) Two 3) Three 4) Four

16. The azimuthal quantum number indicates

1) Size of the orbital 2) Shape of the orbital

2) Orientation of the orbital 4) Spin of electron

17. Which of the following is indicated by the principal quantum number?

1) Size of the orbital 2) Shape of the orbital

2) Orientation of the orbital 4) Spin of electron

18. The two electrons in the same orbital have .spin quantum number values

1) $+\frac{1}{2}, +\frac{1}{2}$ 2) $-\frac{1}{2}, -\frac{1}{2}$ 3) $+\frac{1}{2}, -\frac{1}{2}$ 4) 0, 0

19. When n=3, l =o the designation given to the orbital is

1) 4s 2) 4p 3) 3s 4) 3p

20. Which of the following designation is impossible?

1) 4s 2) 5d 3) 2f 4) 6p

21. l = 3, then the values of magnetic quantum numbers are

1) $\pm 1, \pm 2, \pm 3$ 2) $0, \pm 1, \pm 2, \pm 3$

3) -1, -2, -3 4) 0, +1, +2, +3

22. For a p-orbital, the values of m are

1) -1, 0, +1 2) 0, +1, +2, +3

3) -2, -1, 0, +1, +2 4) -3, -2, -1, 0, +1, +2, +3

23. The impossible set of quantum numbers is

1) n = 2, l = 0, m = 0 , s = +1/2 2) n = 2, l = 1, m = 0 , s = +1/2

3) n = 2, l = 0, m = 1 , s = –1/2 4) n = 3, l = 1, m = -1 , s = –1/2

24. The azimuthal quantum number for the last electron in Lithium atom is

1) 1 2) 2 3) 0 4) 3

25. The two electrons of an orbital differ in their

1) Principal quantum number 2) Azimuthal quantum number

3) Magnetic quantum number 4) Spin quantum number

26. Which of the following sets of quantum numbers is correct for an electron in 4 f orbital?

1) n = 4, l = 3, m = + 4, s = +1/2 2) n = 3, l = 2, m = –2, s = +1/2

3) n = 4, l = 3, m = +1, s = +1/2 4) n = 4, l = 4, m = – 4, s = – ½

27. The set of quantum numbers not applicable to an electron is

1) 1, 1, 1, +1/2 2) 1, 0, 0, +1/2 3) 1, 0, 0, -1/2 4) 2, 0, 0, +1/2

28. The value of m for p_z orbital is

1) Same as that of S-orbital 2) Same as that of -orbital

3) 0 4) All of these

29. The maximum number of electrons that a p-orbital can accommodate is

1) 6 2) 2 3) 10 4) 14

30. The number of orbitals in the quantum level n = 3 is

1) 4 2) 9 3) 16 4) 18

KEY

1)3 2) 4 3)3 4)4 5)2 6)3 7)4 8)4 9)2 10)2

11)4 12)2 13)2 14)4 15)4 16)2 17)1 18)3 19)3 20)3

21)2 22)1 23)3 24)3 25)4 26)3 27)1 28)4 29)2 30)2