Quantum numbers-1

Atomic Structure-14

Rejection is a part of any man's life. If you can't accept and move past rejection, you're not worthy of being a man." — Jiraiya

MCQs

Q1. **The following quantum no. are possible for how many orbitals n = 3, l = 2, m = +2 ?**
(A) 1
(B) 2
(C) 3
(D) 4

Q2. **Number of possible orbitals (all types) in n = 3 energy level is :-**
(A) 1
(B) 3
(C) 4
(D) 9

Q3. **Which sub-shell is not permissible:**
(A) 2d
(B) 4f
(C) 6p
(D) 3s

Q4. **Number of orbitals in h sub-shell is**
(A) 11
(B) 15
(C) 17
(D) 19

Q5. **Which of the following is correct for a 4d- electron**
(A) n=4, l=2, s = + 1/2
(B) n=4, l=2, s = 0
(C) n=4, l=3, s = 0
(D) n=4, l=3, s = + 1/2

Q6. **If n = 3, then which value of ' l' is correct :**
(A) 0
(B) 1
(C) 2
(D) All of them

Q7. **Which statement is not correct for n = 5. m = 2**
(A) l = 4
(B) l = 0, 1, 2, 3; s = + 1/2
(C) l = 3
(D) l = 4,3,2

Q8. **The maximum number of electrons in a p- orbital with n = 6 and m = 0 can be :-**
(A) 14

(B) 6
(C) 2
(D) 10

Q9. **The total number of values of m for electrons in n = 4 shell is**
(A) 4
(B) 8
(C) 16
(D) 32

Q10. **In an atom, for how many electrons, the quantum numbers will be n = 3, l = 2, m = + 2, s = +1/2**
(A) 18
(B) 6
(C) 24
(D) 1

Q11. **Which orbital is represented by the complete wave function ψ_{420} :**
(A) 4d
(B) 3d
(C) 4p
(D) 4s

Q12. **An electron is in one of 4d orbital. Which of the following orbital quantum number value is not possible :-**
(A) n = 4
(B) l=1
(C) m = 1
(D) m = 2

Q13. **A neutral atom of an element has 2K, 8L, 11 M and 2N electrons. The number of s- electron in the atom are**
(A) 2
(B) 8
(C) 10
(D) 6

Q14. **If l = 3 then type and number of orbital is :-**
(A) 3p, 3
(B) 4f, 14
(C) 5f, 7
(D) 3d, 5

Q15. **n,l and m values of electron in 3Py orbital are:**
(A) n = 3; l = 1 and m = 1
(B) n = 3 ; l = 1 and m = -1
(C) Both 1 and 2 are correct
(D) None of these

Q16. **For the shell of principal quantum number n, the total number of electrons that can be accomodated by this shell is**
(A) $\sum_{l=0}^{0} 2(2l+1)$
(B) $\sum_{l=1}^{n-1} 2(2l+1)$
(C) $\sum_{l=0}^{n-1} 2(2l+1)$

(D) $\sum_{l=0}^{n-1} 2(2l+1)-1$

Q17. Maximum number of electrons in a sub-shell of an atom is determined by the following

(A) $2n^2$
(B) $4l+2$
(C) $2l+1$
(D) $4l-2$

Q18. Which of the following is not permissible arrangement of electrons in an atom ?

(A) n = 3,l = 2, m = -2 , s = -1 /2
(B) n =4 , l = 0, m = 0, s = -1 /2
(C) n = 5, l = 3, m = 0, s = + 1 /2
(D) n = 3, l = 2

Q19. The total number of atomic orbitals in fourth energy level of an atom is :-

(A) 8
(B) 16
(C) 32
(D) 4

Q20. Maximum number of electrons in a subshell with l = 3 and n = 4 is :-

(A) 10
(B) 12
(C) 14
(D) 16

Q21. Maximum number of electrons associated with n = 3, l = 1, m = -1 is

(A) 2
(B) 10
(C) 6
(D) 4

Q22. Number of orbitals corresponding to n = 3, l = 1, m = 0 is

(A) 1
(B) 2
(C) 3
(D) 4

Q23. If l = 2 and n = 3, the maximum number of electrons is

(A) 2
(B) 6
(C) 12
(D) 10

Q24. For azimuthal quantum number l, the total number of magnetic quantum numbers is

(A) $\frac{l+1}{2}$
(B) $\frac{l-1}{2}$
(C) $2l+1$
(D) $\frac{2l-1}{2}$

Q25. Possible m values for a p orbital are

(A) 0
(B) -1,0,+1
(C) -2,-1,0,+1,+2
(D) -3,-2,-1,0,+1,+2,+3

Q26. Notation of orbital with n = 5 and l = 3 is

(A) 2p
(B) 5s

(C) 5f
(D) 3d

Q27. Shape of an orbital is decided by

(A) Principal quantum number n
(B) Spin quantum number s
(C) Azimuthal quantum number l
(D) Magnetic quantum number m

Q28. Orientation of orbitals is decided by

(A) Magnetic quantum number m
(B) Spin quantum number s
(C) Azimuthal quantum number l
(D) Principal quantum number n

Q29. Values of n,l,m,s for the electron in $4s^1$ orbital are respectively

(A) 4,1,0,+1/2
(B) 4,0,1,+1/2
(C) 4,0,0,+1/2
(D) 4,2,0,+1/2

Q30. Which subshell has l = 1?

(A) s
(B) p
(C) d
(D) f

Q31. For n = 3, the permitted values of l and m are

(A) l = 0; m = 0 l = 1; m = -1,0,+1 l = 2; m = -2,-1,0,+1,+2
(B) l = 0; m = 1 l = 2; m = -2,1,-2 l = 3; m = +3,+2,+1,1,0,-2,-3
(C) l = 0; m = 0 l = 1; m =1,2,3 l = 2; m = -3,-2,0,+1,+2
(D) l = 0; m = 0,1 l = 2; m = 1,2 l = 3; m = 0,1,2,3

Q32. A d orbital can accommodate up to

(A) 5 electrons
(B) 10 electrons
(C) 2 electrons
(D) 6 electrons

Q33. If n and l are principal and azimuthal quantum numbers, expression for total electrons in any shell is

(A) $\sum_{l=1}^{n} 2(2l+1)$
(B) $\sum_{l=1}^{n-1} 2(2l+1)$
(C) $\sum_{l=0}^{n-1} 2(2l+1)$
(D) $\sum_{l=0}^{n-1} 2(2l+1)-?$

Q34. Magnetic quantum number is related to

(A) Size
(B) Orientation
(C) Spin
(D) Shape

Q35. Maximum number of electrons in a subshell is given by

(A) $4l-2$
(B) $4l+2$

(C) $2l + 2$
(D) $2n^2$

Q36. In the third principal shell, the total number of orbitals is
(A) 16
(B) 9
(C) 4
(D) 1

Q37. Possible number of orientations of a subshell is
(A) l
(B) n
(C) $2l + 1$
(D) n^2

Q38. Correct set of quantum numbers for the last electron of Fe is
(A) n=4, l=0, m=0, s=+1/2
(B) n=3, l=2, m=±2, s=+1/2
(C) n=3, l=1, m=0, s=+1/2
(D) n=3, l=1, m=2, s=0

Q39. Maximum number of electrons in a subshell with l = 3 and n = 4 is
(A) 10
(B) 12
(C) 14
(D) 16

Q40. Total number of subshells in the fourth shell is
(A) 4
(B) 8
(C) 16
(D) 32

Q41. For which set will an electron have the highest energy? (for next next assignment)
(A) n=3, l=2, m=1, s=+1/2
(B) n=4, l=2, m=-1, s=+1/2
(C) n=4, l=1, m=0, s=-1/2
(D) n=5, l=0, m=0, s=-1/2

Q42. For n = 5, the number of orbitals having l = 3 is
(A) 7
(B) 14
(C) 9
(D) 18

Q43. Which combination of n,l,m,s is not permissible?
(A) 3,2,-2,-1/2
(B) 3,3,1,-1/2
(C) 3,2,1,+1/2
(D) 3,1,1,-1/2

Q44. Which set(s) of quantum numbers is/are not possible?
(A) (i) 3,0,0,+1/2; (ii) 2,2,1,+1/2; (iii) 4,3,-2,-1/2; (iv) 1,0,-1,-1/2; (v) 3,2,3,+1/2
(B) (ii), (iv) and (v)
(C) (i) and (iii)
(D) (ii), (iii) and (iv)

Q45. Any f orbital can accommodate up to
(A) 2 electrons with parallel spins
(B) 6 electrons
(C) 2 electrons with opposite spins
(D) 14 electrons

Q46. **Order the electrons by increasing energy (A:n=4, l=1), (B:n=4, l=0), (C:n=3, l=2), (D:n=3, l=1) (for next next assignment)**

(A) A < B < C < D
(B) D < C < B < A
(C) D < B < C < A
(D) C < B < A < D

Q47. **Total number of atomic orbitals in the fourth energy level is**

(A) 4
(B) 8
(C) 16
(D) 32

Q48. **The following quantum numbers are possible for how many orbitals: n = 3, l = 2, m = +2?**

(A) 1
(B) 2
(C) 3
(D) 4

Q49. **For which of the following sets is m = 0 for all orbitals shown?**

(A) 2s, $2p_x$, $3d_{xy}$
(B) 3s, $2p_z$, $3d_{z^2}$
(C) 2s, $2p_z$, $2d_{x^2-y^2}$
(D) 3s, $3p_x$, $3d_{yz}$

Q50. **In any subshell, the maximum number of electrons with the same spin quantum number is**

(A) $l(l+1)$
(B) $l+2$
(C) $2l+1$
(D) $4l+2$

Q51. **Number of electrons, orbitals and types of orbitals respectively in the N shell are**

(A) 4, 4 and 8
(B) 4, 8 and 16
(C) 32, 16 and 4
(D) 4, 16 and 32

Q52. **Which set of quantum numbers is correct for an electron in a 4f orbital?**

(A) n=3, l=2, m=2, s=+1/2
(B) n=4, l=4, m=4, s=-1/2
(C) n=4, l=3, m=1, s=+1/2
(D) n=4, l=3, m=4, s=+1/2

"Failing a test, being misunderstood, getting low marks—it's okay. Accept it, learn, rise stronger."