Quantum number-3

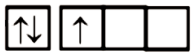
DPP-16

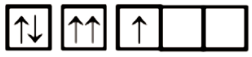
Sub: Chemistry | Chapter: Atomic structure | Vikrant Sir

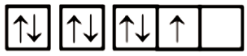
A hero is not the one who never falls, he is the one who gets up, again and again, never losing sight of his dream.

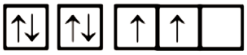
---

1. **Which configuration does not obey Pauli's exclusion principle?**

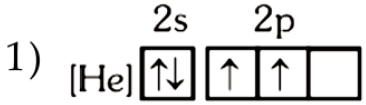
   1) 

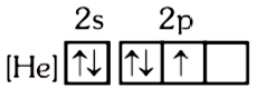
   2) 

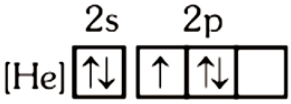
   3) 

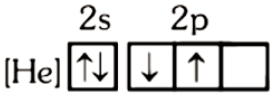
   4) 

2. **Which of the following configuration follows the Hund's rule?**

   1) 

   2) 

   3) 

   4) 

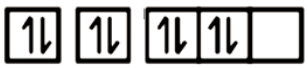
3. **The basis of three unpaired electrons present in the configuration of nitrogen is:**
   (A) Aufbau principle
   (B) Pauli's principle
   (C) Hund's principle
   (D) Uncertainty principle

4. **The orbital with maximum energy is:**
   (A) 3d
   (B) 5p
   (C) 4s
   (D) 6d

5. **n and ℓ values of an orbital A are 3 and 2 and for another orbital B are 5 and 0. The energy of:**
   (A) B is more than A
   (B) A is more than B
   (C) A and B are of same energy
   (D) None

6. **Number of all subshells for $n + \ell = 7$ is:**

(A) 4
(B) 5
(C) 6
(D) 7

7. **Electronic configuration**  **has violated:**
(A) Hund's rule
(B) Pauli's principle
(C) Aufbau principle
(D) $(n + \ell)$ rule

8. **The total spin resulting from a d^9 configuration is:**
(A) $\frac{1}{2}$
(B) 1
(C) $\frac{3}{2}$
(D) 2

9. **^{36}Kr has configuration $[\text{Ar}]_{18}\, 4\text{s}^2\, 3d^{10}\, 4p^6$. The 39th electron will go into:**
(A) 4f
(B) 4d
(C) 3p
(D) 5s

10. **For atomic number 17, the number of orbitals containing electron pairs in the valence shell is:**
(A) 8
(B) 2
(C) 3
(D) 6

11. **Which transition shows neither absorption nor emission of energy in hydrogen atom?**
(A) $3p_x \rightarrow 3s$
(B) $3d_{xy} \rightarrow 3d_{yz}$
(C) $3s \rightarrow 3d_{xy}$
(D) All the above

12. **In ground state ^{24}Cr, number of orbitals with paired and unpaired electron is:**
(A) 10
(B) 12
(C) 15
(D) 18

13. **For Na ($Z = 11$) the set of quantum numbers for last electron is:**
(A) $n = 3,\ \ell = 1,\ m = +1,\ s = +\frac{1}{2}$
(B) $n = 3,\ \ell = 0,\ m = 0,\ s = +\frac{1}{2}$
(C) $n = 3,\ \ell = 1,\ m = 0,\ s = +\frac{1}{2}$
(D) $n = 3,\ \ell = 1,\ m = +1,\ s = -\frac{1}{2}$

14. **Which set of quantum numbers is correct for the 19th electron of Chromium?**

(A) $n = 3,\ \ell = 0,\ m = 0,\ s = \frac{1}{2}$
(B) $n = 3,\ \ell = 2,\ m = -2,\ s = \frac{1}{2}$
(C) $n = 4,\ \ell = 0,\ m = 0,\ s = \frac{1}{2}$
(D) $n = 4,\ \ell = 1,\ m = -1,\ s = \frac{1}{2}$

15. **Which set of quantum number is correct for an electron in $3p$ orbital?**
(A) $n = 3,\ \ell = 2,\ m = 0,\ s = +\frac{1}{2}$
(B) $n = 3,\ \ell = 0,\ m = +1,\ s = +\frac{1}{2}$
(C) $n = 3,\ \ell = -2,\ m = -1,\ s = +\frac{1}{2}$
(D) $n = 3,\ \ell = 1,\ m = 0,\ s = +\frac{1}{2}$

16. **An atom of Cr ($Z = 24$) loses 2 electrons. Number of unpaired electrons in Cr^{2+} is:**
(A) 4
(B) 3
(C) 2
(D) 1

17. **Atomic weight of an element is double its atomic number. If there are three electrons in $2p$ subshell, the element is:**
(A) C
(B) N
(C) O
(D) Ca

18. **A transition metal X has configuration [Ar] $3d^5$ in its $+3$ oxidation state. Its atomic number is:**
(A) 22
(B) 26
(C) 28
(D) 19

19. **Outermost orbit configuration $4s^2$. The atomic number would be:**
(A) 29
(B) 24
(C) 30
(D) 19

20. **Sum of the paired electrons present in the orbital with $\ell = 2$ in all the species Fe^{2+}, Co^{2+} and Ni^{2+} is:**
(A) 9
(B) 12
(C) 6
(D) 15

21. **Electronic configuration of an element in its first excited state which is isoelectronic with O_2 is:**
(A) Ne $3s^2\ 3p^3\ 3d^1$
(B) Ne $3s^2\ 3p^4$
(C) Ne $3s^1\ 3p^3\ 3d^2$
(D) Ne $3s^1\ 3p^5$

22. **The quantum numbers of the 20th electron of Fe ($Z = 26$) would be:**
(A) $3,\ 2,\ m = -2,\ s = -\frac{1}{2}$
(B) $3,\ 2,\ m = 0,\ s = +\frac{1}{2}$
(C) $4,\ 0,\ m = 0,\ s = +\frac{1}{2}$
(D) $4,\ 1,\ m = -1,\ s = +\frac{1}{2}$

23. **The atomic number with maximum number of unpaired $3p$ electrons (ground state) is:**
(A) 15
(B) 10
(C) 12
(D) 8

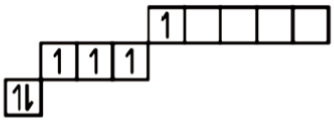
24. **Which element contains non-spherical electron density?**
(A) He
(B) B
(C) Be
(D) Li

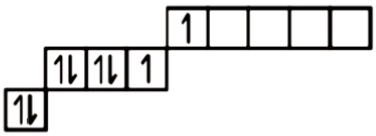
25. **If $n = 6$, the correct sequence for filling of electrons will be:**
(A) $ns \to (n-2)f \to (n-1)d \to np$
(B) $ns \to (n-1)d \to (n-2)f \to np$
(C) $ns \to (n-2)f \to np \to (n-1)d$
(D) $ns \to np \to (n-1)d \to (n-2)f$

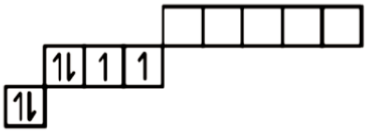
26. **Magnetic moment 2.83 B.M. is given by which ion? (Ti=22, Cr=24, Mn=25, Ni=28)**
(A) Ti^{3+}
(B) Ni^{2+}
(C) Cr^{3+}
(D) Mn^{2+}

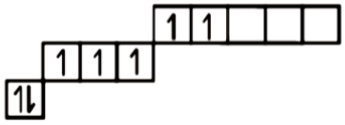
27. **The number of d-electrons in Fe^{2+} ($Z = 26$) is not equal to the number of electrons in which one?**
(A) p-electrons in Cl ($Z = 17$)
(B) d-electrons in Fe ($Z = 26$)
(C) p-electrons in Ne ($Z = 10$)
(D) s-electrons in Mg ($Z = 12$)

28. **Which one represents ground state configuration?**

1) 

2) 

3) 

4) 

29. **The electronic configuration of a dipositive metal ion M^{2+} is $2, 8, 14$ and its ionic weight is 58 amu. The number of neutrons in its nucleus would be:**
   (A) 30
   (B) 32
   (C) 34
   (D) 42

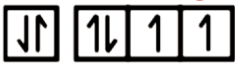
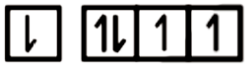
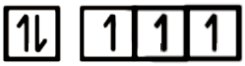
30. **In an atom having 2K, 8L, 8M and 2N electrons, the number of electrons with $m = 0,\ s = +\frac{1}{2}$ are:**
   (A) 6
   (B) 2
   (C) 8
   (D) 16

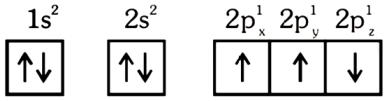
31. **The number of electrons in the M-shell of the element with atomic number 24 is:**
   (A) 24
   (B) 12
   (C) 8
   (D) 13

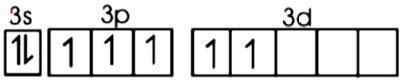
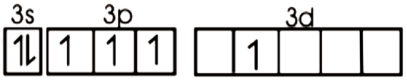
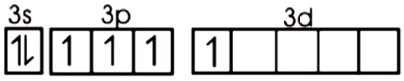
32. **Magnetic moment 2.84 B.M. is given by: (Ni=28, Ti=22, Cr=24, Co=27)**
   (A) Ti^{3+}
   (B) Cr^{2+}
   (C) Co^{2+}
   (D) Ni^{2+}

33. **The energy of an electron of $2p_y$ orbital is:**
   (A) Greater than $2p_x$
   (B) Less than $2p$ orbital
   (C) Same as that of $2p_x$ and $2p_z$
   (D) Equal to $2s$

34. **Correct order of increasing energy of orbitals in Ti ($Z = 22$):**
   (A) $3s < 3p < 3d < 4s$
   (B) $3s < 3p < 4s < 3d$
   (C) $3s < 4s < 3p < 3d$
   (D) $4s < 3s < 3p < 3d$

35. **Which orbital diagram does not obey Aufbau principle?**
   1) 
   2) 
   3) 
   4) 

36. **Which one is a wrong statement?**
   (A) Total orbital angular momentum of electron in s orbital is zero
   (B) An orbital is designated by three quantum numbers; an electron by four
   (C) The electronic configuration of N atom is 
   (D) The value of m for d_{z^2} is zero

37. **Which of the following has maximum energy?**
   1) 
   2) 
   3) 
   4) 

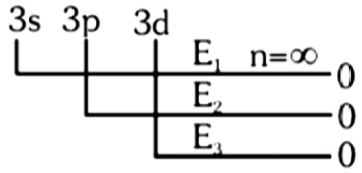
38. **Maximum number of electrons accommodated when highest principal $n = 4$:**
   (A) 10
   (B) 18
   (C) 36
   (D) 54

39. **Electronic energy of hydrogen atom depends on:**
   (A) n, ℓ, m
   (B) n, ℓ only
   (C) n, m only
   (D) n only

40. **Electrons with quantum numbers: (a) $n = 4, \ell = 1$; (b) $n = 4, \ell = 0$; (c) $n = 3, \ell = 2$; (d) $n = 3, \ell = 1$ can be placed in increasing energy as:**
   (A) (a) < (c) < (b) < (d)
   (B) (c) < (d) < (b) < (a)
   (C) (d) < (b) < (c) < (a)
   (D) (b) < (d) < (a) < (c)

41. **A filled or half-filled set of p or d orbitals is spherically symmetric. Which species has spherical symmetry?**
    (A) Na
    (B) C
    (C) Cl^-
    (D) Fe

42. **For H atom, energies required for removing electron from various sub-shells E_1, E_2, E_3 are given;**



    the order is:
    (A) $E_1 > E_2 > E_3$
    (B) $E_3 > E_2 > E_1$
    (C) $E_1 = E_2 = E_3$
    (D) None of these

43. **Correct order of increasing energy of atomic orbitals:**
    (A) $5p < 4f < 6s < 5d$
    (B) $5p < 6s < 4f < 5d$
    (C) $4f < 5p < 5d < 6s$
    (D) $5p < 5d < 4f < 6s$

44. **Which shell would be the first to have g subshell?**
    (A) L
    (B) M
    (C) N
    (D) O

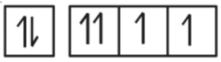
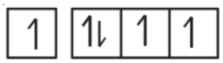
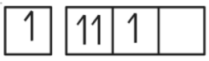
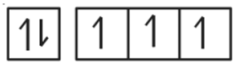
45. **Which electronic configuration is not possible?**
    (A) $2p^3$
    (B) $2s^6$
    (C) $4s^1$
    (D) $5f^8$

46. **Electronic configuration of Cu (29) is:**
    Ar $4s^1 3d^5$
    Ar $4s^1 3d^{10}$
    Ar $4s^0 3d^4$
    Ar $4s^0 3d^9$

47. **According to Aufbau principle which of $4d, 5p, 5s$ will be filled first?**
    (A) $4d$
    (B) $5p$
    (C) $5s$
    (D) $4d$ and $5s$ simultaneously

48. **Energies of orbitals of H-atom are in the order:**
(A) $3s < 3p < 4s < 3d < 4p$
(B) $3s < 3p < 3d < 4s < 4p$
(C) $3s = 3p = 3d < 4s = 4p$
(D) $3s = 3p = 3d < 4s < 4p$

49. **No two electrons in an atom can have:**
(A) Same principal quantum number
(B) Same azimuthal quantum number
(C) Same magnetic quantum number
(D) Same set of all four quantum numbers

50. **In which electronic arrangement are all three rules (Aufbau, Pauli, Hund) invalid?**
1) 
2) 
3) 
4) 

51. **Incorrect electronic configuration is represented by (At. No.: Gd:64, W:74, Pd:46, Mo:42)**
(A) Gd = [Xe] $4f^7 5d^1 6s^2$
(B) W = [Xe] $4f^{14} 5d^4 6s^2$
(C) Pd = [Kr] $4d^9 5s^1$
(D) Mo = [Kr] $4d^5 5s^1$

52. **If $n = 6$, the correct sequence of filling of electrons will be:**
(A) $ns \to np \to (n-1)d \to (n-2)f$
(B) $ns \to (n-2)f \to (n-1)d \to np$
(C) $ns \to (n-1)d \to (n-2)f \to np$
(D) $ns \to (n-2)f \to np \to (n-1)d$

53. **Which ion has configuration [Ar] $3d^6$? (Mn=25, Fe=26, Co=27, Ni=28)**
(A) Co^{3+}
(B) Ni^{3+}
(C) Mn^{3+}
(D) Fe^{3+}

54. **A transition element X has configuration (Ar) $3d^4$ in its $+3$ oxidation state. Its atomic number is:**
(A) 22
(B) 19
(C) 25
(D) 26

55. **Among the following which one is *not* paramagnetic? [Be=4, Ne=10, As=33, Cl=17]**
(A) Ne
(B) Be^{+}
(C) Cl^{-}
(D) As^{+}

56. **The four quantum numbers of valence electron of potassium are:**
(A) $4, 0, 1, \frac{1}{2}$
(B) $4, 1, 0, \frac{1}{2}$
(C) $4, 0, 0, \frac{1}{2}$
(D) $4, 1, 1, \frac{1}{2}$

57. **In the ground state, an element has 13 electrons in its M-shell. The element is:**
(A) Manganese
(B) Cobalt
(C) Nickel
(D) Iron

58. **If each orbital can hold a maximum of 3 electrons, number of elements in the 2nd period (long form) is:**
(A) 27
(B) 9
(C) 18
(D) 12

59. **Correct set of four quantum numbers for outermost electron of potassium ($Z = 19$) is:**
(A) $3, 1, 0, +\frac{1}{2}$
(B) $4, 0, 0, +\frac{1}{2}$
(C) $3, 0, 0, +\frac{1}{2}$
(D) $4, 1, 0, +\frac{1}{2}$

60. **Which of the following configuration is correct for iron?**
(A) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$
(B) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$
(C) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$
(D) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$

61. **Which has maximum number of unpaired d-electrons?**
(A) N^{3+}
(B) Fe^{2+}
(C) Zn^{+}
(D) Cu^{+}

Answer Key

1	B	**2**	A	**3**	C	**4**	D	**5**	A
6	A	**7**	A	**8**	A	**9**	B	**10**	C
11	D	**12**	C	**13**	B	**14**	C	**15**	D
16	A	**17**	B	**18**	B	**19**	C	**20**	B
21	A	**22**	C	**23**	A	**24**	B	**25**	A
26	B	**27**	A	**28**	C	**29**	B	**30**	A
31	D	**32**	D	**33**	C	**34**	B	**35**	B
36	C	**37**	B	**38**	C	**39**	D	**40**	C
41	C	**42**	C	**43**	B	**44**	D	**45**	B
46	B	**47**	C	**48**	C	**49**	D	**50**	C
51	C	**52**	B	**53**	A	**54**	C	**55**	C
56	C	**57**	A	**58**	D	**59**	B	**60**	D
								61	B