

Practice sheet quantum number 02

- Q.4 If possible values of spin quantum numbers are 3 i.e. $-\frac{1}{2}, 0, +\frac{1}{2}$. The permissible values of other quantum numbers and rules for filling of orbitals remains unchanged, then number of elements in 4th period is
(A) 27 (B) 18 (C) 9 (D) 54
- Q.5 If each orbital were containing three electrons, then the ground state electronic configuration of iron were:
(A) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$ (B) $1s^3 2s^3 2p^6 3s^3 3p^6 4s^3 3d^2$
(C) $1s^3 2s^3 2p^9 3s^3 3p^8$ (D) $1s^3 2s^3 2p^6 3s^3 3p^6 3d^5$
- Q.6 The sum of azimuthal quantum number of the orbital whose electron cause maximum screening and the one whose cause minimum screening (for same value of 'n') is equal to
(A) The value of principal quantum number
(B) Number of different orbitals present in a shell
(C) Number of different subshells possible in a shell.
(D) Shell number of the penultimate shell.
- Q.7 If an electron has the quantum numbers : $m = 3$ and $s = -\frac{1}{2}$, it may belong to :
(A) s - subshell (B) p - subshell (C) d - subshell (D) f - subshell
- Q.8 Which of the following set of Quantum numbers is not possible?
(A) $n = 4, \ell = 3, m = +2, s = +1/2$ (B) $n = 4, \ell = 2, m = +2, s = -1/2$
(C) $n = 4, \ell = 2, m = -2, s = +1/2$ (D) $n = 4, \ell = 1, m = -2, s = -1/2$
- Q.9 The total number of orbitals with $n + \ell = 10$, is
(A) 5 (B) 16 (C) 25 (D) 36
- Q.13 Quantum numbers of some electrons are given below on the basis of it, arrange them from lowest to highest energy order.
- | | n | l | m | s |
|-----|---|---|----|----------------|
| I | 4 | 1 | 0 | $\frac{1}{2}$ |
| II | 5 | 0 | 0 | $-\frac{1}{2}$ |
| III | 6 | 2 | 0 | $+\frac{1}{2}$ |
| IV | 6 | 3 | -1 | $+\frac{1}{2}$ |
- (A) $I < II < III < IV$ (B) $II < III < I < IV$ (C) $II < III < IV < I$ (D) $IV < II < III < I$

Q.17 In ground state of phosphorus atom ($Z = 15$), the numbers of occupied sub-shells and occupied orbitals are respectively

- (A) 3, 3 (B) 5, 9 (C) 5, 5 (D) 3, 6

Q.18 Which of the following has maximum unpaired electrons?

- (A) Fe^{3+} (B) Fe^{2+} (C) Mn^{3+} (D) Sc^{3+}

Q.19 The number of elements which should be theoretically present in 8th period of the modern long form of periodic table, is

- (A) 32 (B) 40 (C) 50 (D) 48

Q.20 The correct option regarding size of orbitals is :

- (A) $3p > 4p > 5p$ (B) $3p < 4p = 5p$
(C) $3p < 4p < 5p$ (D) $3p = 4p = 5p$

Q.21 If Aufbau rule is not followed, Potassium atomic number -19 will be placed in

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

Q.22 If spin quantum number have the values $+\frac{1}{2}$, 0 and $-\frac{1}{2}$ but all other quantum number have values as they have, then the maximum number of electrons in 5th orbit should be

- (A) 25 (B) 50 (C) 75 (D) 33

Q.23 The correct option regarding size of orbitals is :

- (A) $2p > 3p > 4p > 5p$ (B) $2p = 3p < 4p = 5p$
(C) $2p < 3p < 4p < 5p$ (D) $2p = 3p = 4p = 5p$

Q.27 What type of orbital is designated $n = 2$, $\ell = 3$, $m_\ell = -2$?

- (A) 4p (B) 4d (C) 4f (D) None

Q.28 The correct set of quantum numbers for the unpaired electron of Bromine atom is

- | | n | ℓ | m | | n | ℓ | m |
|-----|---|--------|---|-----|---|--------|---|
| (A) | 2 | 1 | 0 | (B) | 2 | 1 | 1 |
| (C) | 4 | 1 | 1 | (D) | 3 | 0 | 0 |

- Q.52 If the electronic configuration of oxygen is written as $\boxed{\uparrow\downarrow}$ $\boxed{\uparrow\downarrow}$ $\boxed{\uparrow\downarrow}\boxed{\uparrow\downarrow}\boxed{}$ it would violate
- (A) Hund's rule (B) Pauli's exclusion principle
(C) Both Hund and Pauli's principles (D) Aufbau principle
- Q.53 A given orbital is labelled by $m = -1$. This can not be :
- (A) s-orbital (B) p-orbital (C) d-orbital (D) f-orbital

[MULTIPLE CORRECT CHOICE TYPE]

- Q.11 Which of the following sub-shells does not exist for an atom, according to quantum theory?
(A) 2d (B) 4f (C) 5h (D) 7h
- Q.12 Which of the following having same value of magnetic moment?
(A) Mn^{2+} & Na^+ (B) Co^{3+} & Fe^{2+} (C) Fe^{3+} & Mn^{2+} (D) Zn^{2+} & Na^+
- Q.13 Which of the following having same value of magnetic moment?
(A) Mn^{2+} & Na^+ (B) Co^{3+} & Fe^{2+} (C) Zn^{2+} & Cl (D) Zn^{2+} & Na^+
- Q.14 Number of electrons present in d-subshell and valence shell in $\text{Cr}_{(24)}$ are :
(A) $3d^5$ (B) $4s^1$ (C) $4d^4$ (D) $5s^2$
- Q.15 In which of the following pairs, the ions are iso-electronic?
(A) Na^+ , F^- (B) Al^{3+} , O^{2-} (C) Na^+ , Ne (D) N^{3-} , Cl^-

Comprehension #9

Imagine a universe in which :

- (a) Principal quantum no. n can have values from 1, 2, 3, ∞ .
- (b) Azimuthal quantum no. l can have values from 1 to $n + 1$ corresponding to A, B, C, D, E, F
- (c) Magnetic quantum no. m can have integral values from $-\frac{l}{2}$ to $+\frac{l}{2}$ (including zero if possible).
- (d) Spin quantum no. s can have 6 possible values.

All rules of filling remains intact.

1. What will be the last shell and subshell for an element with $Z = 36$?

- (a) 2A
- (b) 1B
- (c) 1C
- (d) 2B

2. What will be the atomic no. of the element, in which last e^- fills the 2nd shell completely?

- (a) 38
- (b) 57
- (c) 76
- (d) 96

3. What is the maximum e^- capacity of a shell for which $n = 4$?

- (a) 32
- (b) 96
- (c) 120
- (d) 114

4. What will be the last shell for an element having $Z = 117$?

- (a) $n = 3$
- (b) $n = 4$
- (c) $n = 5$
- (d) $n = 6$

Q.39

Column I

Column II

- | | | | |
|-----|---|-----|----|
| (A) | Violation of AUFBAU principle | (P) | Ca |
| (B) | Possible species which has 12 electrons for $l = 1$ | (Q) | Cr |
| (C) | Maximum possible species which has same $(n + l)$ value for last electron | (R) | Mn |
| (D) | Maximum possible species which can have even number of electrons for $m = -1$ | (S) | Co |
| | | (T) | Ag |

Q.57 Find the total number of paramagnetic species among the following?



(If your answer is 15 so write is 0015)

Q.58 Calculate the total number of p-orbitals electrons present in Ag (47) atom.

(If your answer is 12 so write is 0012)

Q.59 Find maximum number of electrons in $_{13}\text{Al}$ in which $\frac{l \times m}{n} = 0$.

Q.60 How many total number of orbitals are present in $_{30}\text{Zn}$ which has m (magnetic quantum number) = 0?

[ANSWER KEY]

Q.4 A

Q.5 C

Q.6 D

Q.7 D

Q.8 D

Q.9 C

Q.13 A

Q.17 B

Q.18 A

Q.19 C

Q.20 C

Q.21 C

Q.22 C

Q.23 C

Q.27 D

Q.28 C

Q.51 D

Q.52 A

Q.53 A

[MULTIPLE CORRECT CHOICE TYPE]

Q.11 AC

Q.12 BCD

Q.13 BD

Q.14 AB

Q.15 AC

Comprehension 9

1. (a), 2. (d), 3. (c), 4. (b)

Q.39 (A) QT (B) PQRS (C) QRS (D) PST

Q.57 0009

Q.58 0018

Q.59 0009

Q.60 0007