

Topic :- Chemical Bonding and Molecular Structure

- 1 (d)
Size of anions is larger than their parent atoms. Also more is ENC lesser is size.
- 2 (d)
 ${}_{22}\text{Ti} : 3s^2, 4s^2 \xrightarrow{IE_1} 3d^2, 4s^1$
 ${}_{23}\text{V} : 3d^3, 4s^2 \xrightarrow{IE_1} 3d^3, 4s^1$
 ${}_{24}\text{Cr} : 3d^5, 4s^1 \xrightarrow{IE_1} 3d^5 \xrightarrow[\text{half-filled}]{IE_2 \text{ from}} \text{maximum}$
 ${}_{25}\text{Mn} : 3d^5, 4s^2 \xrightarrow{IE_1} 3d^5, 4s^1$
- 4 (a)
C - Cl bond is more ionic than C - I bond because of the greater difference in electronegativities of C and Cl as compared to that of carbon and iodine. Therefore, C - Cl bond is stronger than C - I bond.
- 5 (c)
Cl is more electronegative than I.
- 6 (b)
The solubility of a compound depends upon its hydration enthalpy. If hydration enthalpy exceeds the lattice enthalpy than it is soluble in water. For Ag_2SO_4 , hydration enthalpy is lower than lattice enthalpy, so it is insoluble in water.
- 7 (c)
Silicon has the tendency to show covalent bonding because of higher IP values.
- 8 (c)
In SnCl_2 , Sn has sp^2 hybridisation and hence, has angular shape
- 9 (c)
The inert gas just after chlorine is argon.
- 10 (d)
The d -orbital involved in $sp^3 d$ -hybridization is d_{zx} .
- 11 (d)
 $O_2 = \sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_z^2 \pi 2p_x^2 = \pi 2p_y^2 \pi^* 2p_x^1 = \pi^* 2p_y^1$
 In O_2^+ , one electron is removed from Na
 BO for $O_2 = 2$ and for $O_2^+ = 2.5$

- Therefore, paramagnetism decreases, BO increases.
- 12 **(b)**
Intramolecular H-bonding is present in *ortho* nitrophenol.
- 14 **(c)**
According to valence shell electron pair repulsion (VSEPR) theory, the order of repulsive interactions between various electron is

$$lp - lp > lp - bp > bp - bp$$
- 15 **(b)**
In like atoms, electronegativity difference is zero.
- 16 **(d)**
BCl₃ has bond angle equal to 120° (trigonal planar). NH₃ and H₂O have sp³ hybridisation but due to the presence of lone pair of electrons, they have bond angle less than 109.28° (NH₃ – 107°, H₂O – 104.5°), AsH₃ (sp³ hybrid) has smaller bond angle than NH₃ due to less electronegativity of As than N.
- 17 **(d)**
 E_{op}° order is Mg > Fe > Cu; more is E_{op}° , more is electropositive character.
- 18 **(c)**
O atom possesses two lone pair of electrons.
- 19 **(a)**
M.O. configuration of O₂⁺ is:
 $\sigma 1s^2 \sigma^* 1s^2, \sigma^* 2s^2 \sigma 2p^2, \pi 2p_y^2 \pi 2p_z^2 \pi^* 2p_x^1$
 Bond order of O₂⁺ = $\frac{1}{2}[6 - 1] = \frac{5}{2}$
 M.O. configuration of N₂⁺ is:
 $\sigma 1s^2 \sigma^* 1s^2, \sigma 2s^2 \sigma^* 2s^2, \pi 2p_y^2 \pi 2p_z^2 \sigma 2p^1$
 Bond order of N₂⁺ = $\frac{1}{2}[5 - 0] = \frac{5}{2}$
- 20 **(c)**
No scope for addition in completely filled valence orbitals of inert gases.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	D	D	C	A	C	B	C	C	C	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	B	A	C	B	D	D	C	A	C

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