DPP

DAILY PRACTICE PROBLEMS

Class : XIth
Date :

Solutions

Subject : CHEMISTRY
DPP No. : 1

Topic :- Chemical Bonding and Molecular Structure

1 **(b)**

SeF_4 has distorted tetrahedral geometry while, CH_4 has tetrahedral geometry

Speed of electron $\neq$ speed of light

2 **(c)**

Butadiene is $CH_2 = CH—CH = CH_2$.

3 **(b)**

37 is atomic number of Rb the electropositive element and 53 is atomic number of iodine (the electronegative element).

4 **(c)**

In methane bond angle is $109°28'$. Methane molecule is tetrahedral in structure.

5 **(b)**

Cs is metal and solid.

6 **(d)**

1. Glycerol has strong hydrogen bonding due to presence of 3 – OH groups in it. It is correct statement.

2. Alkyl halides have lower boiling point than alcohols because alcohols have stronger forces of attraction between the hydrogen bonds as compared to weaker van der Waals' forces between molecules of alkyl halide.

$\therefore$ Statement (d) is false.

7 **(a)**

Ionic radii $= \frac{n^2 a_0}{Z_{\text{eff}}}$

8 **(c)**

Only those atomic orbitals combine, that have nearly equal energy

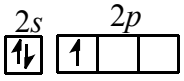
9 **(b)**

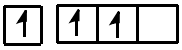
The stability of the ionic bond depends upon the lattice energy which is expected to be more between Mg and F due to +2 charge on Mg atom

10 **(a)**

Smaller is anion, lesser is its polarization.

11 **(b)**

$B_{(G.S.)}$ 

$B_{(E.S.)}$ 

sp^2- hybridisation

Boron has planar structure due to sp^2 hybridisation.

12 **(c)**

3. NO^-(16). According to MOT.

$$\sigma 1s^2, {}^*\sigma 1s^2, \sigma 2s^2, {}^*\sigma 2s^2, \sigma 2p_x^2, \begin{cases} \pi p_y^2 \\ \pi 2p_z^2, \end{cases} \begin{cases} {}^*\pi 2p_y^1 \\ {}^*\pi 2p_z^1, \end{cases}$$

$$\text{Bond order} = \frac{\text{bonding electrons} - \text{antibonding electrons}}{2}$$

$$= \frac{10-6}{2} = 2$$

4. NO^+(14).

$$\sigma 1s^2, {}^*\sigma 1s^2, \sigma 2s^2, {}^*\sigma 2s^2, \sigma 2p_x^2, \begin{cases} \pi 2p_y^2 \\ \pi 2p_z^2, \end{cases}$$

$$\text{Bond order} = = \frac{10-4}{2} = 3$$

5. NO (15)

$$\sigma 1s^2, {}^*\sigma 1s^2, \sigma 2s^2, {}^*\sigma 2s^2, \sigma 2p_x^2, \begin{cases} \pi 2p_y^2 \\ \pi 2p_z^2, \end{cases} \begin{cases} {}^*\pi 2p_y^1 \\ {}^*\pi 2p_z^0 \end{cases}$$

$$\text{Bond order} = = \frac{10-5}{2} = 2.5$$

(iv)NO^{2+}(13).

$$\sigma 1s^2, {}^*\sigma 1s^2, \sigma 2s^2, {}^*\sigma 2s^2, \sigma 2p_x^2, \begin{cases} \pi 2p_y^2 \\ \pi 2p_z^2, \end{cases}$$

$$\text{Bond order} = = \frac{9-4}{2} = 2.5$$

6. NO^{2-}(17)

$$\sigma 1s^2, {}^*\sigma 1s^2, \sigma 2s^2, {}^*\sigma 2s^2, \sigma 2p_x^2, \begin{cases} \pi 2p_y^2 \\ \pi 2p_z^2, \end{cases} \begin{cases} {}^*\pi 2p_y^2 \\ {}^*\pi 2p_z^1 \end{cases}$$

$$\text{Bond order} = = \frac{10-7}{2} = 1.5$$

The order of bond order is

$NO^{2-} < NO^- < NO^{2+} \approx NO < NO^+$

13 **(d)**

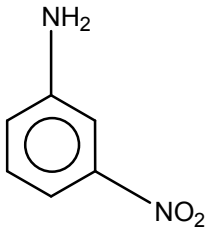
Cl is more electronegative than Br.

14 **(c)**

Boron in $[BF_4]^-$ has regular tetrahedral geometry because of sp^3-hybridization on boron atom.

15 **(d)**

Usually symmetrical molecules have less dipole moment in comparison to unsymmetrical molecules.



Hence, (m-nitroaniline) has the highest dipole moment among the given.

16 **(a)**

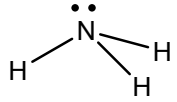
Thus, excitation of 2s-electron in N is not possible.

17 **(b)**

PF_5 has sp^3d hybridization (trigonal bipyramid); BrF_5 has sp^3d^2 hybridization (square pyramidal)

18 **(d)**

In NH_3 sp^3 hybridisation is present but its shape becomes pyramidal due to the presence of one lone pair of electron.



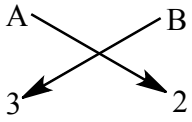
19 **(d)**

Higher the lattice energy lower the solubility. Out of the four combinations possible, the lattice energy of MgS (bi-bivalent ionic solid) is higher than those of Na_2S, $MgCl_2$ (uni-bivalent or biuni-valent ionic solids) and NaCl (uni-univalent ionic solids) and hence, MgS is the least soluble.

20 **(b)**

A three electrons in its outermost orbit, its valency is 3. B has six electrons in its outermost orbit, its valency is 2

Element



Valency

Formula of the compound = A_2B_3

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