DPP
DAILY PRACTICE PROBLEMS

Class : XIth
Date :

Solutions

Subject : CHEMISTRY
DPP No. : 10

Topic :- Chemical Bonding and Molecular Structure

1 **(b)**

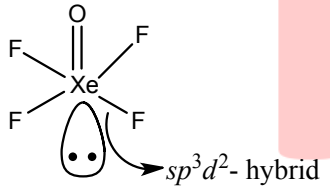
Molecule	Hybridization
SO_3	sp^2
C_2H_2	sp
C_2H_4	sp^2
CH_4	sp^3
CO_2	sp

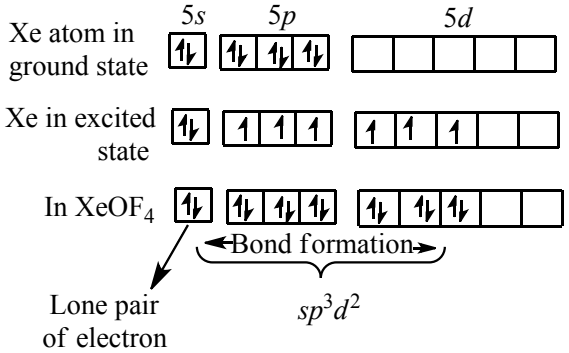
2 **(b)**

$Mg^{2+}$is smaller thanNa^+ and thus, smaller is cation more is hydration energy.

3 **(b)**

Number of lone pair in $XeOF_4$ is one (1). The structure of $XeOF_4$ is given as follows :





One π-bond so remaining six electron pairs form an octahedron with one position occupied by a lone pair.

4 **(d)**

These are the factors on which van der Waals' forces depend.

5 **(b)**

It has sp^3d^3-hybridization with one lone pair on X*e*.

6 **(b)**

Bond order $\propto \frac{1}{\text{Bond length}}$

BO of NO<BO of NO^+

$\therefore$ Bond length of NO is greater than the bond length of NO^+.

7 **(b)**

Element with atomic number 20 is metal (Ca); it will combine with non-metal.

8 **(a)**

A decrease in *s*-character increases bond length.

10 **(b)**

Calculated dipole moment,

$$\mu_{cal} = 2.0 \times 10^{-10}\ \text{m} \times 1.6 \times 10^{-19}\ \text{C}$$
$$= 3.2 \times 10^{-29}\ \text{C} - \text{m}.$$

Percentage of ionic character $= \frac{\mu_{exp}}{\mu_{cal}} \times 100$

$$= \frac{5.12 \times 10^{-29}}{3.2 \times 10^{-29}} \times 100 = 16\%$$

11 **(c)**

C_2H_4 involves sp^2-hybridization on carbon atoms.

12 **(b)**

According to molecular orbital theory.

$$F_2(18) = \sigma 1s^2, {}^{*}_{\sigma}1s^2, \sigma 2s^2, {}^{*}_{\sigma}2s^2, \sigma 2p_z^2, \pi 2p_x^2 \approx \pi 2p_y^2, {}^{*}_{\pi}2p_{x,}^2 \approx {}^{*}_{\pi}2p_y^2$$

Bond order in $F_2 = \frac{N_{b-}N_a}{2} = \frac{10-8}{2} = 1$

15 **(a)**

Bond formation is always exothermic. Compounds of sodium are ionic.

16 **(d)**

In case of water, five water molecules are attached together through four hydrogen bonding

17 **(b)**

Removal of electron is easier in the order of shell $4 > 3 > 2 > 1$

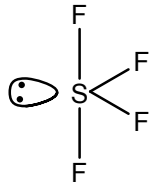
18 **(c)**

Bond order of NO^+, NO and NO^- are 3, 2.5 and 2 respectively.

Bond energy $\propto$ bond order.

19 **(a)**

F*X*F angles of two types are present in sp^3d hybrid orbitals. Since, SF_4 shows sp^3d hybridisation as follows, therefore, it exhibits two different F*X*F angles.



20 **(c)**

s-character $\propto$ bond angle

For 25% *s* character (as in sp^3hybrid orbital), bond angle is 109.5°, for 33.3% *s* character (as in sp^2 hybrid orbital),bond angle is 120° and for 50% *s* character (as in *sp* hybrid

orbital), bond angle is 180°.

Similarly, when the bond angle decreases below 1.9.5°,the$s-$character will decrease accordingly

Decreasing in angle $= 120° - 109.5° = 10.5°$

$\therefore$ Decrease in s-character $= 33.3 - 25 = 8.3$

Actual decrease in bond angle $= 109.5° - 105° = 4.5°$

$\therefore$ Expected decrease in s-character

$= \frac{8.3}{10.5} \times 4.5 = 3.56\%$

Thus, the s-character should decrease by about 3.56%, *ie*, s-character

$= 25 - 3.56 = 21.44\%$

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