Cł	nemical E	30	nding	ÈT	- Self Evaluation Test - ${f 3}$
		-			
inat		/een tv			(c) $H_3O^+$ (d) $NH_4^{\oplus}$
(a)	Oxidation potential	(b) (d)	Electronegativity	12.	The dipole moment of chlorobenzene is 1.73 D. The dipole mo
(C) Tw	o elements X and Y have	(u) e follos	ving electronic configurations		of $p$ -dichlorobenzene is expected to be
v	$Y = 1s^2 2s^2 2n^6 3s^2 3n^6 4s^2$				[СРМТ
Л	-13, $23$ , $2p$ , $33$ , $3p$ ,	, 43	anu		(a) 3.46 D (b) 0.00 D
Y	$=1s^2, 2s^2, 2p^0, 3s^2, 3p^3$	. The e	expected compound formed by	13	(c) 1.73 D (d) 1.00 D Polarization of electrons in acrolein may be written as
con	nbination of $X$ and $Y$ is	[BHL	l 1990]		[IIT
(a)	$XY_2$	(b)	$X_5 Y_2$		$\delta^ \delta^+$ $\delta^-$
(c)	$X_2Y_5$	(d)	$XY_5$		(a) $C H_2 = CH - C H = O$ (b) $C H_2 = CH - CH =$
Ele	ctricity do not pass through i	onic co	ompounds		$\begin{pmatrix} \delta^{-} & \delta^{+} \\ c H & -C H & C H - O \\ c H & -C H & C H - O \\ c H & -C H & C H - C H \\ c H & -C H & C H - C H \\ c H & -C H & -C H \\ c H & -C H & -C H \\ c H & -C H & -C H \\ c H & -C H & -C H \\ c H $
(a)	In solution	(b)	In solid state		(c) $CH_2 = CH - CH = O$ (d) $CH_2 = CH - CH =$
(c)	In melted state	(d)	None of these	14.	The order of dipole moments of the following molecules is
Fro	om the following which compo	ound o	n heating readily sublimes		(a) $CHCl_{2} > CH_{2}Cl_{2} > CH_{2}Cl_{2} > CCl_{2}$
(a)	NaCl	(b)	$MgCl_2$		(a) $\operatorname{CH}_{2} \operatorname{CH}_{2} \operatorname{CH}_{2} \operatorname{CH}_{3} \operatorname{CH}_{2} \operatorname{CH}_{4}$
(c)	$BaCl_2$	(d)	AlCl <sub>3</sub>		(b) $CH_2Cl_2 > CH_3Cl > CHCl_3 > CCl_4$
Wh	nich one in the following con	tains i	onic as well as covalent bond [	11T 1979: C	(c) $CH_3Cl > CH_2Cl_2 > CHCl_3 > CCl_4$ CPMT 1983; DPMT 1983]
(a)	CH .	(b)	Н.		(d) $CH_2Cl_2 > CHCl_3 > CH_3Cl > CCl_4$
(u)	KCN	(1)	KCl	15.	The electronegativity of $C, H, O, N$ and $S$ are 2.5, 2.1, 3.5
(C)		(a)	КСl	-	and 2.5 respectively. Which of the following bond is most polar
Ine	e solution of sugar in water c	ontain	[NCERT 1972: MP PET 2000]		(a) $O-H$ (b) $S-H$
(a)	Free atoms		[[[[[[[]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]		(c) $N-H$ (d) $C-H$
(b)	Free molecules			16.	Which of the following bond has the most polar character
(c)	Free ions				[DPMT 1982; CBSE PMT 1992; CPMT
(d)	Free atoms and free molecu	ıles			(a) $C - O$ (b) $C - Br$
ln v	In which of the following reactions, there is no change in the valency				(c) $C-S$ (d) $C-F$
(-)	$A V C O \rightarrow 2 V C O \rightarrow$	VCI	[NCERT 1974; CPMT 1971, 78]	17.	The geometry of $H_2S$ and its dipole moment are [IIT
(a)	$4KClO_3 \rightarrow 5KClO_4 + 1$	KCi			(a) Angular and non-zero (b) Angular and zero
(b)	$SO_2 + 2H_2S \rightarrow 2H_2O$	+35			(c) Linear and non-zero (d) Linear and zero
(c)	$BaO_2 + H_2SO_4 \rightarrow BaS_4$	SO <sub>4</sub> +	$H_2O_2$	18.	How many $\sigma$ and $\pi$ bonds are there in the molecu
(d)	$2BaO + O_2 \rightarrow 2BaO_2$				N = C
The	e octet rule is not followed in		[BHU 1981]		N = C N = C C = C C = N
(a)	$F_2$	(b)	NaF		N = C $C = N$
(c)	CaF.	(d)	BF.		[NCERT 1980; MP PMT 1980, 95; Urissa JEE
(c)	11 11 · 1 · · · ·	(u)			(a) Nime O and nime $\chi$ (b) Five O and nime $\chi$
500	lium chloride is an ionic com	pound	whereas hydrogen chloride is		(c) Nine $\sigma$ and seven $\pi$ (d) Five $\sigma$ and eight $\pi$
(a)	(a) Sodium is reactive       [NCET 2002]         (b) Covalent bond is weaker than ionic bond			19.	The shape of $H_3O^+$ ion is [EAMCET 1993; CPMT 2001]
(b)					(a) Linear (b) Angular
(c)	(c) Hydrogen chloride is a gas				(c) Trigonal planar (d) Triangular pyramidal
(d)	Covalent bond is stronger t	than io	nic bond	20.	The hybridization in sulphur dioxide is[ <b>11T 1986; DPMT 1990</b> ]
Wh	nich one of the following mole	ecules	has a coordinate bond		(a) $sp^{2}$ [CPMT 1988, 94] (b) $sp^{3}$
(a)	$NH_4Cl$	(b)	AlCl <sub>3</sub>		(c) $sp^2$ (d) $dsp^2$
(c)	NaCl	(d)	$Cl_2$	21.	The number and type of bonds between two carbon ator
Co-	-ordinate bond is absent in		[RPMT 2002]		CaC <sub>2</sub> are [IIT
(a)	$BH_4^{\bigcirc}$	(b)	$CO_{3}^{-2}$		(a) One signar $(\sigma)$ and one pi $(\pi)$ bonds
(a)	D11 <sub>4</sub> ~	(0)	CO 3		(a) One sigma ( $\sigma$ ) and one pi ( $\pi$ ) bonds

SELF S	150 Chemical Bonding		
	<ul> <li>(b) One sigma (σ) and two pi (π) bonds</li> <li>(c) One sigma (σ) and one and a half pi (π) bonds</li> </ul>		(a) 3 (b) 2 (c) 1 (d) 1/2
	(d) One sigma $(\sigma)$ bond	28.	In the process, $O_2^+ \rightarrow O_2^{+2} + e^-$ the electron lost is from
22.	Which of the following resonating structures of $N_2O$ is the momentum contributing(a) $N \equiv N - O$ (b) $N - N \equiv O$ (c) $N = N - O$ (d) $N - N = O$	ost 29.	[Orrissa JEE 2002] (a) Bonding $\pi$ -orbital (b) Antibonding $\pi$ -orbital (c) $2p_z$ orbital (d) $2p_x$ orbital The maximum number of hydrogen bonds formed by a water
23.	The hybridization of atomic orbitals of nitrogen in $NO_2^+$ , $NO_3^-$ and $NH_4^+$ are [IIT Screening 200 (a) $sp$ , $sp^3$ and $sp^2$ respectively		[MP PET 1993; AFMC 2002;UPSEAT 1999, 2001, 02] (a) 4 (b) 3 (c) 2 (d) 1
24.	<ul> <li>(b) sp, sp<sup>2</sup> and sp<sup>3</sup> respectively</li> <li>(c) sp<sup>2</sup>, sp and sp<sup>3</sup> respectively</li> <li>(d) sp<sup>2</sup>, sp<sup>3</sup> and sp respectively</li> <li>The molecule having one unpaired electron is</li> </ul>	30.	[AIIMS 1998; MP PET/PMT 1998] (a) Glycerine (b) Water (c) Hydrogen sulphide (d) Hydrogen fluoride
25.	[IIT 1985; MP PMT 198(a) $NO$ (b) $CO$ (c) $CN^-$ (d) $O_2$ The geometry of $ClO_3^-$ , according to valence shell electron participation.	<b>39] 31.</b> air	The bonds in $K_4$ [ $Fe(CN)_6$ ] are [EAMCET 1991] (a) All ionic (b) All covalent (c) Ionic and covalent (d) Ionic, covalent and coordinate covalent
26.	repulsion (VSEPR) theory will be[KCET 1996; MP PET 199(a)Planar triangle(b)Pyramidal(c)Tetrahedral(d)Square planarWhich of the following halogens has the highest bond energy(a) $F_2$ (b) $Cl_2$ (c) $Br_2$ (d) $I_2$	32. 97]	In which of the following ionic, covalent and coordinate bonds are present [UPSEAT 2002] (a) Water (b) Ammonia [CPMT 1988] (c) Sodium cyanide (d) Potassium bromide
27.	What bond order does $O_2^{2-}$ have [Pb. PMT 200	01]	



- (a) From electronic configuration valencies of X and Y are + 2 and -1 respectively so formula of compound is  $XY_2$ .
- 5. (c) Structure of KCN is  $[K^+(C^-\equiv N)]$ .

## Chemical Bonding 151

- 6. Sugar is an organic compound which is covalently bonded so in (b) water it remains as free molecules.
- In the reaction  $BaO_2 + H_2SO_4 \rightarrow BaSO_4 + H_2O$  valency 7. (c) is not changing.
- $BF_3$  does not have octet, it has only six electrons so it is 8. (d) electron deficient compound.
- NaCl is a ionic compound because it consists of more (b) 9 elelctronegativity difference compare to HCl.
- $NH_4Cl$  has a coordinate bond besides covalent and ionic 10. (a)

**-**+

bonds 
$$\begin{bmatrix} H \\ H \\ H \\ -N \\ H \end{bmatrix}^{+} Cl^{-}$$
$$O^{-}$$

-

- $^{-}O C = O$  has covalent bonds only. (b) 11.
- (b) Due to symmetry dipole moment of *p*-dichloro benzene is zero. 12. 13. (d)
- CCl<sub>4</sub> has zero dipole moment because of symmetric (d) 14. tetrahedral structure.  $CH_3Cl$  has slightly higher dipole moment which is equal to 1.86*D*. Now  $CH_3Cl$  has less electronegativity then  $CH_2Cl_2$ . But  $CH_2Cl_2$  has greater dipole moment than  $CHCl_3$ .
- More the difference in electronegativity of atoms. Bond 15. (a) between them will be more polar.
- C-F bond has the most polar character due to difference of 16. (d) their electronegativity.
- $H_2S$  has angular geometry and have some value of dipole 17. (a) moment.

(a) 
$$N\sigma \frac{\pi}{\pi} C \qquad \sigma C = C = \sigma N$$
  
$$N\sigma \frac{\pi}{\pi} C \qquad \sigma C = C = C = \sigma N$$
  
$$N\sigma = C \qquad \sigma C = C = \sigma N$$

 $9\pi$  and  $9\sigma$  bonds.

18.

- (d)  $H_3O^+$  has  $sp^3$  hybridization and its shape is triangular 19. pyramidal due to lone pair on oxygen.
- $SO_2$  molecule has  $sp^2$  hybridisation. 20. (c) (b) In  $\parallel \Box a$  two carbons are joined with  $1\sigma$  and  $2\pi$  bonds. 21.
- (a) In  $N_2O$  molecule  $N \equiv N O$  structure is most contributed. 22.
- (b) The shape of  $NO_2^+, NO_3^-$  and  $NH_4^+$  are linear trigonal 23. planar and tetrahedral respectively. Thus the hybridization of atomic orbitals of nitrogen in these species are  $sp, sp^2$  and  $sp^3$  respectively.
- (a) NO has one unpaired electron with Nitrogen. 24

: N :: O :

**25.** (b) 
$${}^{-}O - Cl - O$$

(b) Bond energy of  $\operatorname{Cl}_2$  is highest among all halogen molecule. 26. Bond energies of  $F_2$ ,  $Cl_2$ ,  $Br_2$ ,  $I_2$  are 37, 58, 46 and 36 Kcal  $mol^{-1}$  respectively.

 $O_2^{2-}$  have bond order one 27. (c)

28.

29.

\*\*\*

B.O. 
$$=\frac{1}{2}[10-8]=\frac{2}{2}=1$$

- Electron lost from antibonding  $\pi$  orbital. (b)
- In ice each water molecule forms four hydrogen bond through (a) which each water molecule is tetrahedrally attached with other water molecule.



- Hydrogen bonding, is present in molecules which have F, O, or 30. (c) N atoms.
- Structure of  $K_4[Fe(CN)_6]$  is 31. (d)

$$4K^{+}\begin{bmatrix} C \equiv N & C \equiv N \\ \downarrow & \downarrow & C \equiv N \\ C \equiv N & \uparrow & C \equiv N \\ C \equiv N & C \equiv N \end{bmatrix}^{4}$$

32. (c) Sodium cyanide contain ionic, covalent and coordinate bond.