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SUBJECT: IIT-IOC	COURSE: GROWTH (XI)	ELP NO.-1	Topic : Chemical Bonding

Race on Lewis-Structure:

1. CO

2. CO_2

3. NO_2^-

4. NO_3^-

5. CCl_3^-

6. $COCl_2$

7. N_3^-

8. O_3

9. CH_3Cl

10. NH_4^+

11. NH_2Cl

12. OCN^-

13. CN^-

14. SCN^-

15. HCN

16. HNC

17. SiF_4

18. $SnCl_3^-$

19. BF_4^-

20. BH_4^-

21. BeF_4^{2-}

22. H_3O^+

23. SO_3

24. SO_2

25. CO_3^{2-}

26. NO_2Cl

27. NOCl

28. F_2O

29. SO_4^{2-}

30. PO_4^{3-}

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SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-2** **Topic : Chemical Bonding**

Only one correct:

1. If y-axis is the approaching axis between two atoms, then which of the set of orbitals can not form the π bond between two atoms in general.

(A) $p_z - p_z$ (B) $p_x - p_x$ (C) $p_x - p_y$ (D) None of these

2. The maximum number of bond and π-bond can be formed between two atoms are respectively.

(A) 4, 3 (B) 3, 2 (C) 2, 3 (D) 3, 1

3. Which of the following set of overlap can not provide π-bond formation.

(A) 3d and 2p (B) 2p and 3p (C) 2p and 2p (D) 3p and 1s

4. The ratio of number of σ-bond to π-bond in N_2 and CO molecules are

(A) 2.0, 2.0 (B) 2, $\frac{1}{2}$ (C) $\frac{1}{2}$, $\frac{1}{2}$ (D) $\frac{1}{2}$, 2

More than one may be correct:

5. If the molecular axis is Z then which of the following overlapping is not possible.

(A) $p_z + p_z = \sigma$ bond (B) $p_x + p_y = \pi$ bond

(C) $p_x + p_x = \pi$ bond (D) $p_y + p_y = \pi$ bond

Paragraph for question nos. 6 to 8

Different types of bonds are formed in the chemical compounds. These bond have different strength and bond energies associated with them. These bonds are formed with atoms in different environments.

6. Which of the following bond has highest bond energy?

(A) σ-bond (B) π-bond

(C) Hydrogen bond (D) None of these

7. Which of the following overlapping is involved in formation of only σ-bond

(A) s-p overlapping (B) p-d overlapping

(C) d-d overlapping (D) p-p overlapping

8. Which of the following hydrides is thermally least stable?

(A) H_2O (B) H_2Te (C) H_2S (D) H_2Se

Match the column:

9. Match the column:

Column I		**Column II**	
(A)	$NH_3.BF_3$	(P)	Ionic bond
(B)	CO	(Q)	Covalent bond
(C)	NH_4Cl	(R)	Co-ordinate bond
(D)	KI_3	(S)	3 lone pair on any one atom

Integer:

10. If molecular axis is X then which of the following overlapping will form π bond.
$p_z + p_z$, $p_x + p_x$, $p_x + p_y$, $S + p_z$, $p_y + p_y$

Answer Key

1.	(C)	**2.**	(B)	**3.**	(D)	**4.**	(C)	**5.**	(B)
6.	(A)	**7.**	(A)	**8.**	(B)				
9.	(A)–Q,R,S; (B)–Q,R; (C)–P,Q,R; (D)–P,Q,R,S.					**10.**	02.00		

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SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-3** **Topic: Chemical Bonding**

1. Draw the structure of the following molecules / ions.

(1) XeF_2 (2) XeF_4

(3) XeF_5^- (4) $XeOF_4$

(5) PCl_3 (6) PCl_5

(7) SF_2 (8) SF_6

(9) IF_3 (10) IF_5

(11) IF_7 (12) OF_2

(13) NO_3^- (14) SF_4

(15) I_3^+ (16) I_3^-

(17) OCl_2 (18) $SnCl_3^-$

(19) HPO_3^{2-} (20) SO_3^{2-}

(21) IO_3^- (22) XeO_3

(23) ClO_3^- (24) ClO_4^-

(25) NO_2^- (26) PCl_4^+

(27) $POCl_3$ (28) SO_4^{2-}

(29) XeF_5^+

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SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-4** **Topic: Chemical Bonding**

Single Correct:

1. The compound MX_4 is tetrahderal. The number of < XMX angles in the compound is
(A) Three (B) Four (C) Five (D) Six

2. What is hybridisation of central atom of anionic part of PBr_5 in crystalline state.
(A) sp^2 (B) sp^3 (C) sp (D) not applicable

3. What is the difference between bond angles in cationic species of PCl_5 and PBr_5 in solid state.
(A) 60° (B) 109°28′ (C) 0° (D) 90°

4. All possible bond angles in anionic part of PCl_5 are.
(A) 109° 28′ only (B) 90°, 180° (C) 90°, 120°, 180° (D) 72°, 90°, 180°

5. Which of the following species does not exist?
(A) XeF_3^- (B) XeF_4 (C) XeF_5^- (D) XeF_6

6. **Statement-1**: CH_4 and CH_2F_2 are having regular tetrahedron geometry.
Statement-2: Both are having same hybridization.
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.

More than may be correct:

7. Which of following pair of species is having different hybridisation but same shape.
(A) $BeCl_2$ and CO_2 (B) CO_2 and SO_2 (C) SO_2 and I_3^+ (D) ICl_2^- and BeH_2

Paragraph for question nos. 8 to 9

Hybridisation is the mixing of atomic orbital of comparable energy and the number of hybrid orbitals formed is equal to the number of pure atomic orbitals mixed up and hybrid orbitals are occupied by σ bond pair and lone pair.

8. Which of the following geometry is most likely to not form from sp^3d hybridisation of the central atom.
(A) Linear (B) Tetrahedral (C) T-Shaped (D) See-Saw

9. "The hybrid orbitals are at angle of X° to one another" this statement is not valid for which of the following hybridisation.

(A) sp^3 (B) sp^2 (C) sp^3d^2 (D) sp

Match the column:

10.

Column -I (Type of orbital)		**Column-II (Orbitals involved in hybridisation)**	
(A)	d_{z^2} -orbital	(P)	sp^3 (Tetrahedral)
(B)	s - orbital	(Q)	sp^3d^2 (Octahedral)
(C)	$d_{x^2-y^2}$ - orbital	(R)	sp^3d (TBP)
(D)	p_y - orbital	(S)	dsp^2 (square planar)

Answer Key

1.	(D)	**2.**	(D)	**3.**	(C)	**4.**	(B)	**5.**	(A)
6.	(C)	**7.**	(C,D)	**8.**	(B)	**9.**	(C)		

10. (A)–Q, R; (B)–P,Q,R,S; (C)–Q,S; (D)–P,Q,R,S.

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SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-5** **Topic: Chemical Bonding**

Only one correct

1. Which of the bond length order data is incorrect–

(A) P–Cl > P–F in PCl_3F_2 (B) S–$F_{(1xial)}$ > S – $F_{(eq)}$ in SF_6

(C) S–$F_{(1xial)}$ > S – $F_{(eq)}$ in SF_4 (D) NO_2^- < NO_3^- (N – O)

2. O_2F_2 is an unstable yellow orange solid and H_2O_2 is a colourless liquid, both have O–O bond. O–O bond length in H_2O_2 & O_2F_2 is respectively.

(A) 1.22Å, 1.48Å (B) 1.48Å, 1.22Å (C) 1.22Å, 1.22Å (D) 1.48Å, 1.48Å

3. Select the correct order of following property.

(A) % s-character : $sp^3 > sp^2 > sp$

(B) $\widehat{ONO}$ bond angle : $NO_3^- > \overset{+}{N}O_2$

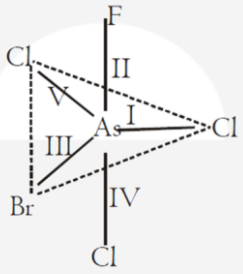
(C) All angles in CH_2F_2 are not identical

(D) C – F bond length : $CF_4 > CH_3F > CH_2F_2 > CF_3H$

4. The strongest P–O bond is found in the molecule

(A) F_3PO (B) Cl_3PO (C) Br_3PO (D) $(3H_3)_3PO$

5. The order of bond length from the following structure.



(A) III > I = V > IV > II (B) IV > II > I = V > III

(C) III > IV > I = V > II (D) I > II > III > IV > V

6. Comment on the C – C bond length for C_2H_6 and C_2F_6 compounds :

(A) $d_{C-C}(3_2H_6) > d_{C-C}(3_2F_6)$ (B) $d_{C-C}(3_2F_6) > d_{C-C(32}H_6)$

(C) $d_{C-C}(3_2F_6) = d_{C-C}(3_2H_6)$ (D) Can't be predicted

More than one correct:

7. The correct set of their indicated bond length is:

(A) S–S (S_8) > P–P (P_4) (B) d_{N-N} ; $NH_2–NH_2 > NF_2–NF_2$

(C) d_{S-Cl} ; $SOCl_2 < SO_2Cl_2$ (D) d_{B-O} ; $B(OH)_3 < [B(OH)_4]^-$

8. The CORRECT statements about the structures of H_2O_2, O_2F_2 and OF_2 is/are:
(A) H_2O_2, O_2F_2, OF_2 are polar compounds
(B) d_{O-O} of H_2O_2 > d_{O-O} of O_2F_2
(C) d_{O-F} of OF_2 > d_{O-F} of O_2F_2
(D) the strength of O–O bond in O_2F_2 is greater than that of H_2O_2

Paragraph for Q. No. 09 to 10

According VSEPR theory, in the electronic geometry of the molecule(s), electron pair tend to minimise repulsion and follow the repulsion order in presence of lone pair of electrons with bond pair of electrons. $\ell p - \ell p > \ell p - bp > bp - bp$ and similarly double bond pair of electrons follow the repulsion order with single bond pair of electrons. double bond – double bond > double bond – single bond > single bond – single bond

9. Which of the following molecular geometry is distorted geometry from their ideal geometry.
(A) PCl_3F_2 (B) SOF_4 (C) XeF_5 (D) XeO_3F_2

10. Which of the following statement is **CORRECT** about XeO_2F_2?
(A) XeO_2F_2 is sp^3d hybridized and has lone pair of electron at axial position of its electronic geometry.
(B) XeO_2F_2 has maximum 10-lone pair of electrons.
(C) XeO_2F_2 has distorted see-saw shape.
(D) XeO_2F_2 contains $d\pi - d\pi$ bond.

Answer Key

1.	(B)	**2.**	(B)	**3.**	(C)	**4.**	(A)	**5.**	(C)
6.	(A)	**7.**	(BD)	**8.**	(ABD)	**9.**	(B)	**10.**	(C)

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SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-6** **Topic: Chemical Bonding**

Only one correct

1. Which of the following statement is **CORRECT** for

$F_3C - CF_2 - CF_3$

(A) All C–F bond lengths are identical

(B) Two C–F bonds attached to middle C-atom are longer compared to other C–F bonds at the terminal C–atoms

(C) Two C–F bonds attached to middle C-atom are shorter compared to other C–F bonds at the terminal C-atoms

(D) None is correct

2. Choose the CORRECT statement regarding bond angle:

(A) FCF in $F_2CO <$ HCH in H_2CO (B) BrPBr in $PBr_3 <$ FPF in PF_3

(C) SFS(eq) > FSF(ax) in SF_4 (D)All FIF angles in IF_5 are identical

3. If the %- s-character in one Sb-H bond in SbH3 is 1.0%. What is % p-character is the orbital occupied by its lone pair -

(A) 99.0 (B) 97 (C) 90 (D) None

4. Choose correct order of bond length

(A) S–S bond length : $S_2O_4^{2-} > S_2O_6^{2-}$ (B) O–O bond length : $H_2O_2 > O_2F_2$

(C) N–N bond length : $N_2O_3 > N_2O_4$ (D) All are correct

5. **Statement-1 :** ClF_2^- is linear while 2 ClF_2^+ is bent.

Statement-2 : Cl - atom in ClF_2^- and in ClF_2^+ , is having same state of hybridisation.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

More than one correct :

6. In which of the following, the theory of hybridisation does not help to predict the bond angle?

(A) PH_3 (B) SbH_3 (C) SiH_4 (D) H_2S

7. Choose the CORRECT statements:

(A) d_{P-F}(1xial) > d_{P-F}(equatorial) in PF_3Cl_2

(B) $d_{P-F} > d_{P-Cl}$ in PF_2Cl_3

(C) $d_{P-Cl}(PF_2Cl_3) > d_{P-Cl}(PF_3Cl_2)$

(D) All d_{P-Cl} (in PF_2Cl_3) are identical while all d_{P-F}(in PF_3Cl_2) are not identical

Match the column:

8.

Column-I	**Column-II**
(A) XeF_5^+	(P) Two lone pairs on central atom
(B) ICl_4^-	(Q) Planar
(C) $TeCl_4$	(R) Non-planar
(D) I_3^+	(S) sp^3d^2 (Hybridization of central atom)

Integer :

9. Identify the pair in which the specified bond length of first is greater than second.

PCl_3F_2, PF_3Cl_2 : BL_{P-Cleq}

SO_2Cl_2, SO_2F_2 : $BL_{S=O}$

BF_3, BCl_3 : B L_{B-X} X = F/Cl

NO_3^-, NO_2^- : B L_{N-O}

O_3, O_2 : B L_{O-O}

CO, CO_2 : B L_{C-O}

10. How many of the following species have no d-orbitals involved in their hybridisation

XeF_2, SnF_2 $PbCl_2$, SF_4, CCl_4, BF_3, SO_2Cl_2, XeO_2F_2, $XeOF_4$, $POCl_3$

Answer Key

1.	(B)	**2.**	(A)	**3.**	(D)	**4.**	(D)	**5.**	(C)
6.	(A)	**7.**	(ACD)	**8.**	(A)–R, S; (B)–P, Q, S; (C)–R; (D)–P, Q.				
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SUBJECT: IIT-IOC	COURSE: GROWTH (XI)	ELP NO.-7	Topic: Chemical Bonding

Only one correct

1. Select the CORRECT statement for H_2 molecule

(A) On time average the molecule is non-polar but at the particular moment it may act as a dipole which is equally probable in all directions

(B) On time average the molecule is polar but at the particular moment it does not act as a dipole.

(C) On time average the molecule is non-polar and the particular moment it does not act as dipole.

(D) All are incorrect

2. Select the correct order of B.P.

(A) $BF_3 > BMe_3$

(B) $BF_3 < BMe_3$

(C) $BF_3 = BMe_3$

(D) None of these

3. Select the correct statement

(A) Boiling point of inert gases decreases down the group

(B) Boiling point of inert gases increases down the group

(C) Boiling point of $H_2 <$ He

(D) None of these

4. **Statement-1 :** Experimentally 100 % covalent bond formation is not possible [3]

Statement-2 : Non-polar molecule has instantaneous dipole – induced dipole interaction

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

5. **Statement-1 :** CCl_4 has lower boiling point than that of $SiCl_4$

Statement-2 : The magnitude of negative charge developed at chlorine atoms in $SiCl_4$ is more in comparison to negative charge developed at chlorine atoms in CCl_4

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

More than one correct:

6. London force works in

(A) Polar molecule
(B) Non-polar molecule
(C) All polar and non-polar molecule
(D) Only in polar molecule

7. London forces depends upon

(A) Molecular weight
(B) Number of polarisable electron
(C) Molecular size
(D) None of these

Comprehension (Q.8 to Q.10)

The existence of intermolecular forces is supported by the facts: non ideality of real gases, Joule-Thomson effect, liquefaction of gases. The electrical field of a dipole can induce a dipole moment in adjacent molecule (which may be polar or non polar) then the induced dipole can interact electrostatically with the polarising dipole.

8. The strongest force among the following is

(A) London force
(B) Ion-dipole interaction
(C) Dipole- induced dipole interaction
(D) Dipole-dipole interaction

9. Select the CORRECT statement:

(A) Boiling point of NF_3 is greater than NMe_3
(B) Greater the dipole moment in molecule, greater will be the dipole-dipole interaction between the molecules.
(C) London dispersion force increases with decreasing number of electrons
(D) Boiling point of hydrides of carbon family decreases down the group.

10. Noble gases can be liquified due to "_____" between atoms:

(A) ion-dipole interaction
(B) dipole-dipole interaction
(C) dipole-induced dipole interaction
(D) instantaneous dipole- induced dipole interaction

Answer key

1.	(A)	**2.**	(B)	**3.**	(B)	**4.**	(A)	**5.**	(D)
6.	(ABC)	**7.**	(ABC)	**8.**	(B)	**9.**	(B)	**10.**	(D)

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SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-8** **Topic: Chemical Bonding**

Single Correct:

1. Select the compounds in which peroxy linkage is absent.

(A) $H_4P_2O_8$ (B) $H_2S_2O_8$ (C) Na_2O_2 (D) $H_2S_2O_7$

2. Which of the following oxyacid having cyclic structure.

(A) $H_2S_4O_6$ (B) $H_5P_5O_{15}$ (C) $H_6P_4O_{13}$ (D) P_4O_{10}

3. All the sulphur atom has +6 oxidation state in given molecules except:

(A) Oleum (B) Caro's acid (C) Dithionic acid (D) Marshall's acid

4. Which of the following statement is incorrect regarding $H_4P_2O_6$ molecule?

(A) It may have P-P linkage (B) It must have P–O–P linkage

(C) It's basicity may be three (D) The number of p_π–d_π bonds = 2

5. The oxyacid contains E–O–E types of linkage:

(A) $H_4P_2O_5$ (B) $H_4P_2O_6$ (hypophosphoric acid)

(C) $H_2S_2O_5$ (D) $H_2N_2O_2$

6. Which of the following having S-O-S linkage –

(A) $H_2S_2O_5$ (B) $H_2S_2O_7$ (C) $H_2S_3O_6$ (D) $H_2S_2O_4$

7. Which of the following oxy-salt does not exist:

(A) Sodium dihydrogen phosphate (B) Sodium dihydrogen hypophosphite

(C) Potassium hydrogen sulphite (D) Sodium metaborate

8. For which of the following oxyacids all hydrogen atoms are not replaceable in nature–

(A) H_2SO_4 (B) H_2CO_3 (C) H_3PO_3 (D) $H_4P_2O_7$

Match the column:

9. Match the column

Column-I	**Column-II**
(A) $H\underline{C}N$	(P) Thio acid
(B) $H_2\underline{S}_2O_3$	(Q) Oxy acid
(C) $H\underline{N}O_3$	(R) Atleast one atom is sp hybridised
(D) $H_2\underline{C}O_2S$	(S) +5 oxidation state is associated in any one atom
	(T) Planarity is observed for underlined atoms

Integer:

10. Find the number of dibasic oxy acids in the following.

H_2CO_3, H_2SO_3, H_3PO_2, H_3PO_3, H_3BO_3

Answer Key

1.	(D)	**2.**	(B)	**3.**	(C)	**4.**	(B)	**5.**	(A)
6.	(B)	**7.**	(B)	**8.**	(C)				
9.	(A)→(R,T); (B)→(P,Q); (C)→(Q,S,T); (D)→(P,Q,T)					**10.**	(03.00)		

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SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-9** **Topic: Chemical Bonding**

Single Correct:

1. Which of the following minerals contain three oxygen corners shared per silicate unit?

(A) $CaMg[(SiO_3)_2]$ (B) $BaTi[Si_3O_9]$

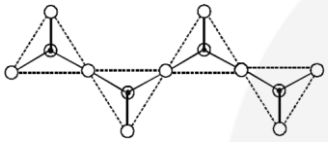
(C) $Ca_2Mg_5[(Si_4O_{11})_2](OH)_2$ (D) $Al_2(OH)_4[Si_2O_5]$

2. Number of corner/oxygen atoms shared per tetrahedron in 3-D silicate and pyroxene silicate are .....and.....respectively–

(A) 2.5, 3 (B) 4, 2 (C) 4, 3 (D) 2, 2

More than one correct:

3. A mineral contain following tetrameric anion in which ● = Si, O = oxygen



Select correct option (s) about anion in mineral –

(A) Formula of anion is $(SiO_3)_n^{2n-}$ (where n = 4) .

(B) The total 10 negative charges are present in this anion.

(C) It has three shared oxygen/corners and ten unshared oxygen/corners.

(D) It is non planar

Comprehension : (Q.4 to Q.6)

Column-I (Unit formula of different silicates)	**Column - II (Number of unshared oxygen in pertetrahedral unit)**	**Column - III (Number of shared oxygen in pertetrahedral unit)**
(I) $(Si_4O_{11}^{-6})_n$	(i) 2	(P) 2
(II) $(Si_2O_5^{-2})_n$	(ii) 1	(Q) 3
(III) $(SiO_2)_n$	(iii) 0	(R) 4
(IV) $(SiO_3^{-2})_n$	(iv) 2	(S) 3

4. For the sheet silicate the only CORRECT combination is:

(A) (II), (i), (P) (B) (II), (ii), (Q) (C) (IV), (ii), (R) (D) (III), (iii), (P)

5. For 3D silicate (silica) the only CORRECT combination is:

(A) (II), (ii), (Q) (B) (III), (iv), (R) (C) (III), (iii), (R) (D) (III), (iv), (S)

6. For single chain silicate the only CORRECT combination is:

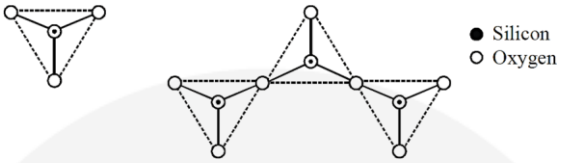
(A) (I), (iii), (R) (B) (IV), (ii), (P) (C) (III), (ii), (Q) (D) (IV), (i), (P)

Comprehension: (Q.7 to Q.9)

Read the following short write-up and answer the questions at the end of it

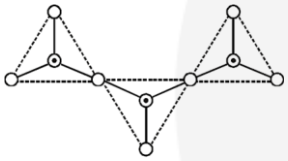
The name 'silica' covers an entire group of minerals, which have the general formula SiO_2, the most common of which is quartz. Quartz is a framework silicate with SiO_4 tetrahedra arranged in spirals. The spirals can turn in a clockwise or anticlockwise direction - a feature that results in there being two mirror images, optically active, varieties of quartz.

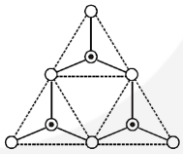
7. The following pictures represent various silicate anions. Their formulae are respectively:



(A) SiO_3^{2}, $Si_3O_7^{2-}$ (B) SiO_4^{4-}, $Si_3O_{10}^{8-}$ (C) SiO_4^{2-}, $Si_3O_9^{2-}$ (D) SiO_3^{4-}, $Si_3O_7^{8-}$

8. $Si_3O_9^{6-}$ (having three tetrahedral) is represented as:

(A) 

(B) 

(C) both (D) none

9. In the given following emperical formula of silicates shared and unshared oxygen corner are same by each tetrahedron in.

(A) $Si_2O_7^{6-}$ (B) $\left(Si_2O_5^{2-}\right)_n$ (C) $\left(SiO_3^{2-}\right)_n$ (D) SiO_4^{4-}

Integer:

10. Tremolite is a silicate mineral with fibrous nature and having tetrahedral unit. The molecular formula of tremolite is $Ca_2Mgx\ [Si_8O_{22}(OH)_2]$ identify the value of x.

Answer Key

1.	(D)	**2.**	(B)	**3.**	(BCD)	**4.**	(B)	**5.**	(C)
6.	(D)	**7.**	(B)	**8.**	(B)	**9.**	(C)	**10.**	05.00

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ELP

Educator Led Practice

SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-10** **Topic: Chemical Bonding**

Que. Draw the structure of the following molecules/ions.

1. H_2SO_4

2. C_3O_2

3. $(CN)_2$

4. $Na_2S_4O_6$

5. Cl_2O_7

6. P_4

7. P_4O_6

8. P_4O_{10}

9. O_2F_2 (dimer form of OF)

10. S_3O_9

11. N_2O_5

12. $S_2O_7^{2-}$

13. N_2F_4

14. N_2O_3

15. SiO_2

16. $HClO_4$

17. $CaCN_2$

18. $CuSO_4.5H_2O$

19. P_4S_{10}

20. $RbIO_2$

21. CsH_2PO_2

22. $NaIO_3$

23. NH_4OCN

24. $H_2S_2O_4$

25. $NaHSO_3$

26. $H_2PO_3^-$

27. $H_2P_2O_5^{2-}$

28. Dithionate ion ($S_2O_6^{2-}$)

29. Trithionate ion ($S_3O_6^{2-}$)

30. Thionyl chloride ($SOCl_2$)

31. Sulpuryl chloride (SO_2Cl_2)

32. Pyrophosphoric acid ($H_4P_2O_7$)

33. Meta phosphoric acid (HPO_3)

34. Peroxy phosphoric acid (H_3PO_5)

35. Ammonium phosphite

36. Sodium hydrogen phosphate

37. Sodium dihydrogen phosphate

38. Sodium dihydrogen pyrophosphate

39. Potassium bicarbonate ($KHCO_3$)

40. Calcium carbide (CaC_2)

41. Peroxy diphophoric acid ($H_4P_2O_8$)

42. Hyponitrous acid ($H_2N_2O_2$)

43. Oleum ($H_2S_2O_7$)

44. Marshall's acid ($H_2S_2O_8$)

45. Caro's acid (H_2SO_5)

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ELP

Educator Led Practice

SUBJECT: IIT-IOC **COURSE: GROWTH (XI)** **ELP NO.-11** **Topic: Chemical Bonding**

Single Correct:

1. A: tetracyanomethane B: carbondioxide C: benzene D: 1,3- buta-di-ene

Ratio of σ and π bonds is in order:

(A) A = B < C < D (B) A = B < D < C (C) A = B = C = D (D) C < D < A < B

2. The geometry of ammonia molecule can be best described as

(A) nitrogen at one vertex of a regular tetrahedron, the other three vertices being occupied by the three hydrogens

(B) nitrogen at the centre of the tetrahedron, three of the vertices being occupied by three hydrogens

(C) nitrogen at the centre of an equilateral triangle, three corners being occupied by three hydrogens

(D) nitrogen at the junction of a T, three open ends being occupied by three hydrogens.

3. Find the molecule which is planar and polar.

(A) $B_3N_3H_6$ (B) $F_2C=C=C=CF_2$ (C) BrF_2Cl (D) $F_2C=C=CF_2$

4. Find out the incorrect order of the dipole moment among the following pair of compound

(A) $NH_3 > NF_3$ (B) p-dichloro benzene > o-dichloro benzene

(C) $CH_3Cl > CH_2Cl_2$ (D) $SiF_4 < SF_4$

5. **Statement-1:** Dipole moment of H_2O is more than that of OF_2.

Statement-2: In H_2O, the resultant bond dipole of O – H bond and the resultant lone pair moment are in opposite direction.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

6. **Statement-1:** Allene is a non polar molecule.

Statement-2: Allene is non planar molecule.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

More than one correct:

7. Calculate the % ionic character in HCl molecule, if internuclear distance of H & Cl is 0.8Å and dipole moment of HCl is 1.2 Debye.

(A) 31.21% (B) 51.2% (C) 16.5% (D) 40.33%

8. Structure of $Na_2[B_4O_5(OH)_4] \cdot 8H_2O$ contains

(A) Two triangular and two tetrahedral units of boron

(B) Three triangular and one tetrahedral units of boron

(C) Five B–O–B linkages

(D) One peroxy linkage

Match the column:

9.

	Column-I		**Column-II**
(A)	2 lone pair	(P)	XeF_5^-
(B)	Zero dipole moment	(Q)	NF_3
(C)	Planar	(R)	ICl_3
(D)	All adjacent bond angles are equal	(S)	XeF_4

Integer:

10. Prove that dipole moment of C_6H_5Cl and m-$C_6H_4Cl_2$ are same.

Answer Key

1.	(A)	**2.**	(B)	**3.**	(D)	**4.**	(B)	**5.**	(C)
6.	(B)	**7.**	(A)	**8.**	(AC)				

9. (A)–P,S; (B)–P,R,S; (C)–P,R,S; (D)–P,Q,S.