

PYQSide

JEE MAIN CHEMICAL BONDING AND MOLECULAR STRUCTURE — VSEPR THEORY AND MOLECULAR GEOMETRY — PYQS

Max. Marks: 40

Questions: 10

Section A (MCQ)

- Q.1** Bromine trifluoride autoionizes to form BrF_2^+ and BrF_4^- . The shapes of the cation and anion are respectively _____ and _____.

[JEE Main 2026 (Online) 8th April Evening Shift]

- (1) bent, square planar (2) linear, square planar
(3) bent, see-saw (4) linear, tetrahedral

Scan or tap for the full solution



- Q.2** SF_4 is isostructural with :

- A. BrF_4^- B. CH_4
C. IF_4^+ D. XeF_4
E. XeO_2F_2

Choose the **correct** answer from the options given below : [JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) C Only (2) C and E Only
(3) A and D Only (4) B and E Only

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- Q.3** Match **List-I** with **List-II** according to shape.

List-I		List-II	
A.	XeO_3	I.	BrF_5
B.	XeF_2	II.	NH_3
C.	XeO_2F_2	III.	$[\text{I}_3]^-$
D.	XeOF_4	IV.	SF_4

Choose the **correct** answer from the options given below :

[JEE Main 2026 (Online) 28th January Evening Shift]

- (1) A-II, B-III, C-I, D-IV (2) A-III, B-II, C-IV, D-I
(3) A-II, B-III, C-IV, D-I (4) A-II, B-I, C-III, D-IV

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- Q.4** Identify the molecule (X) with maximum number of lone pairs of electrons (obtained using Lewis dot structure) among HNO_3 , H_2SO_4 , NF_3 and O_3 . Choose the correct bond angle made by the central atom of the molecule (X).

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) 107° (2) 102° (3) 120° (4) 116°

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- Q.5** Which statements are **NOT TRUE** about XeO_2F_2 ?

- A. It has a see-saw shape.
B. Xe has 5 electron pairs in its valence shell in XeO_2F_2 .
C. The O–Xe–O bond angle is close to 180° .
D. The F–Xe–F bond angle is close to 180° .
E. Xe has 16 valence electrons in XeO_2F_2 .

Choose the **correct** answer from the options given below :

[JEE Main 2026 (Online) 23rd January Evening Shift]

- (1) B, D and E Only (2) B and D Only
(3) B, C and E Only (4) A and D Only

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- Q.6** Given below are two statements :

Statement-I: The number of species among SF_4 , NH_4^+ , $[\text{NiCl}_4]^{2-}$, XeF_4 , $[\text{PtCl}_4]^{2-}$, SeF_4 and $[\text{Ni}(\text{CN})_4]^{2-}$, that have tetrahedral geometry is 3.

Statement-II: In the set $[\text{NO}_2]$, BeH_2 , BF_3 , AlCl_3 , all the molecules have incomplete octet around central atom.

In the light of the above statements, choose the correct answer from the options given below:

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) Both Statement-I and Statement-II are true
(2) Statement-I is true but Statement-II is false
(3) Statement-I is false but Statement-II is true
(4) Both Statement-I and Statement-II are false

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- Q.7** Match the **List I** with **List II**.

List - I Molecule/Ion		List - II Bond pair : lone pair (on the central atom)	
A.	ICl_2^-	I.	4:2
B.	H_2O	II.	4:1
C.	SO_2	III.	2:3
D.	XeF_4	IV.	2:2

Choose the correct answer from the options given below: [JEE Main 2025 (Online) 7th April Morning Shift]

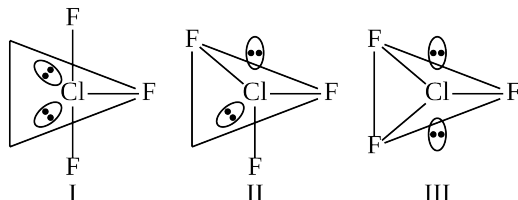
- (1) A-IV, B-III, C-II, D-I (2) A-III, B-IV, C-I, D-II
(3) A-II, B-I, C-IV, D-III (4) A-III, B-IV, C-II, D-I

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Q.8 Given below are two statements:

Statement-I: For ClF_3 , all three possible structures may be drawn as follows.



Statement-II: Structure III is most stable, as the orbitals having the lone pairs are axial, where the lp – bp repulsion is minimum.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

[JEE Main 2025 (Online) 4th April Evening Shift]

- (1) Both Statement-I and Statement-II are correct
(2) Both Statement-I and Statement-II are incorrect
(3) Statement-I is correct but Statement-II is incorrect
(4) Statement-I is incorrect but Statement-II is correct

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Q.9 A molecule with the formula AX_4Y has all its elements from p-block. Element A is rarest, monoatomic, non-radioactive from its group and has the lowest ionization enthalpy value among A, X and Y. Elements X and Y have first and second highest electronegativity values respectively among all the known elements. The shape of the molecule is: [JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) Pentagonal planar (2) Square pyramidal
(3) Trigonal bipyramidal (4) Octahedral

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Q.10 The molecules having square pyramidal geometry are [JEE Main 2025 (Online) 28th January Morning Shift]

- (1) BrF_5 & PCl_5 (2) SbF_5 & PCl_5
(3) BrF_5 & XeOF_4 (4) SbF_5 & XeOF_4

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	
Ans.	1	2	3	2	3	3	4	3	2	3	