

Q1 - 24 January - Shift 2

What is the number of unpaired electron(s) in the highest occupied molecular orbital of the following species : N_2 ; N_2^+ ; O_2 ; O_2^+ ?

- (1) 0, 1, 2, 1
- (2) 2, 1, 2, 1
- (3) 0, 1, 0, 1
- (4) 2, 1, 0, 1

Space for your notes:

Q2 - 25 January - Shift 1

The total number of lone pairs of electrons on oxygen atoms of ozone is _____

Space for your notes:

Q3 - 25 January - Shift 2

Statement I :- Dipole moment is a vector quantity and by convention it is depicted by a small arrow with tail on the negative centre and head pointing towards the positive centre.

Statement II :- The crossed arrow of the dipole moment symbolizes the direction of the shift of charges in the molecules.

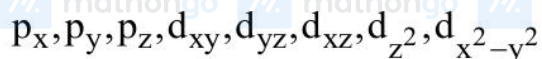
In the light of the above statements, choose the most appropriate answer from the options given below :-

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

Space for your notes:

Q4 - 25 January - Shift 2

The number of given orbitals which have electron density along the axis is _____



Space for your notes:

Q5 - 29 January - Shift 2

According to MO theory the bond orders for O_2^{2-} , CO and NO^+ respectively, are

- (1) 1, 3 and 3 (2) 1, 3 and 2
(3) 1, 2 and 3 (4) 2, 3 and 3

Space for your notes:

Q6 - 30 January - Shift 1

For OF_2 molecule consider the following:

- (A) Number of lone pairs on oxygen is 2.
(B) FOF angle is less than 104.5° .
(C) Oxidation state of O is -2 .
(D) Molecule is bent 'V' shaped.
(E) Molecular geometry is linear.

Space for your notes:

Correct options are:

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

Q7 - 30 January - Shift 1

Match List I with List II

Space for your notes:

LIST-I (molecules/ions)		LIST-II (No. of lone pairs of e ⁻ on central atom)	
(A)	IF ₇	I.	Three
(B)	ICl ₄ ⁻	II.	One
(C)	XeF ₆	III.	Two
(D)	XeF ₂	IV.	Zero

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

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

Q8 - 30 January - Shift 2

Match List I with List II:

Space for your notes:

	List I (Complexes)		List II (Hybridisation)
(A)	[Ni(CO) ₄]	I	sp ³
(B)	[Cu(NH ₃) ₄] ²⁺	II	dsp ²
(C)	[Fe(NH ₃) ₆] ²⁺	III	sp ³ d ²
(D)	[Fe(H ₂ O) ₆] ²⁺	IV	d ² sp ³

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

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Q9 - 31 January - Shift 1

Match List I with List II

List I	List II
A. XeF_4	I. See – saw
B. SF_4	II. Square planar
C. NH_4^+	III. Bent T – shaped
D. BrF_3	IV. Tetrahedral

Space for your notes:

Choose the correct answer from the options given below :

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

Q10 - 31 January - Shift 2

Amongst the following, the number of species having the linear shape is _____.

 $\text{XeF}_2, \text{I}_3^+, \text{C}_3\text{O}_2, \text{I}_3^-, \text{CO}_2, \text{SO}_2, \text{BeCl}$ and BCl_2^\ominus

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Questions with Solutions

MathonGo

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Answer Key

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(As per Official NTA Key released on 2 Feb)

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Q1 (1)

Q2 (6)

Q3 (4)

Q4 (5)

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Q5 (1)

Q6 (4)

Q7 (2)

Q8 (4)

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Q9 (4)

Q10 (5)

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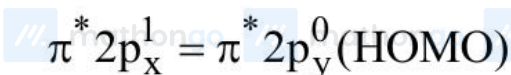
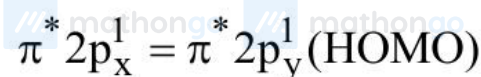
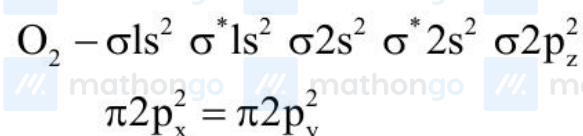
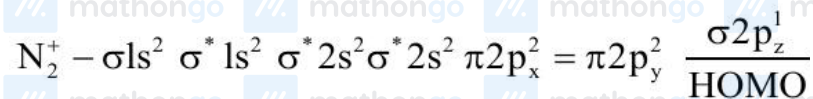
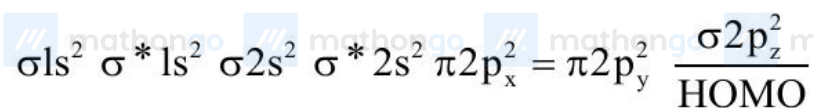
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Questions with Solutions

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Q1 (1)

 N_2 

$N_2 \Rightarrow 0$ unpaired e^- in HOMO

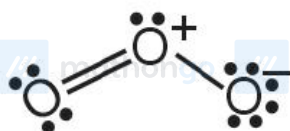
$N_2^+ \Rightarrow 1$ unpaired e^- in HOMO

$O_2 \Rightarrow 2$ unpaired e^- in HOMO

$O_2^+ \Rightarrow 1$ unpaired e^- in HOMO

Q2 (6)

(Total no. of lone pairs on oxygen atoms = 6)



Q3 (4)

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Statement II: The crossed arrow symbolises the direction of the shift of electron density in the molecule.

Q4 (5)

p_x, p_y, p_z, d_{z^2} & $d_{x^2-y^2}$ are axial orbitals.

Q5 (1)

Theory based.

Q6 (4)



- Two lone pair one oxygen
- Molecule is 'v' shaped
- Bond angle is less than 104.5° (102°)
- O.S. of 'O' is + 2

Q7 (2)

IF_7 zero lone pair

ICl_4^- two lone pair

XeF_6 one lone pair

XeF_2 three lone pair

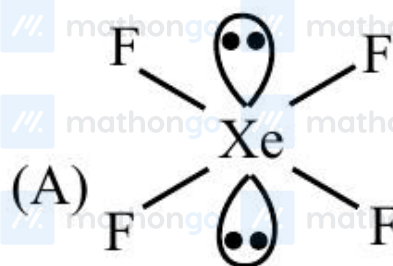
Q8 (4)

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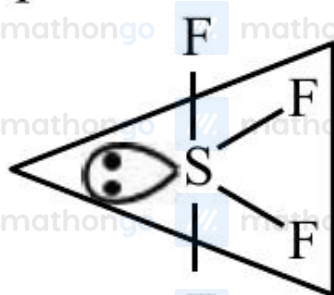
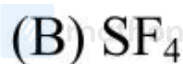
For $[\text{Fe}(\text{NH}_3)_6]^{+2}$, $\Delta_0 < P$, hence the pairing of electrons does not occur in t_{2g} . Therefore complex is outer orbital and its hybridisation is sp^3d^2 .

List I (Complexes)	List II (Hybridisation)
$[\text{Ni}(\text{CO})_4]$	sp^3
$[\text{Cu}(\text{NH}_3)_4]^{2+}$	dsp^2
$[\text{Fe}(\text{NH}_3)_6]^{2+}$	sp^3d^2
$[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$	sp^3d^2

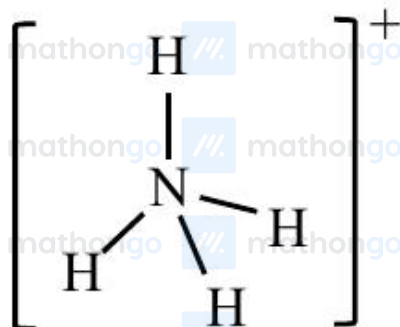
Q9 (4)



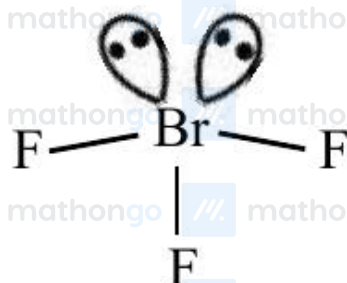
Square planer



See-Saw



Tetrahedral



Bent T- Shaped

Q10 (5)

