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NEET CHEMICAL BONDING AND MOLECULAR STRUCTURE — PYQS

Max. Marks: 436 **Questions:** 109

Section A (MCQ) — 109 questions

Q.1 Identify the correct statement about ClF_3 from the following options : [NEET (UG) 2026]

(1) It has T-shaped geometry with three lone pairs on Cl atom.

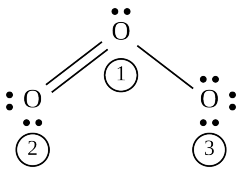
(2) It has T-shaped geometry with two lone pairs on Cl atom.

(3) It has a trigonal pyramidal geometry with two lone pairs on Cl atom.

(4) It has a planar trigonal geometry with two lone pairs on Cl atom.

Scan or tap for the full solution

Q.2 The correct formal charges on oxygen atoms numbered 2, 1 and 3 respectively are : [NEET (UG) 2026]



(1) 0, 0, 0 (2) −1, 0, +1

(3) +1, 0, −1 (4) 0, +1, −1

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Q.3 Match **List-I** with **List-II** : [NEET (UG) 2026]

List-I		List-II	
A.	C_2H_4	I.	3σ bonds, 2π bonds
B.	C_2H_2	II.	3σ bonds, one lone pair
C.	CH_4	III.	4σ bonds
D.	NH_3	IV.	5σ bonds, 1π bond

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

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

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Q.4 The highest occupied molecular orbital for Ne_2 is [RE-NEET (UG) 2026]

(1) σ^*_{2p} (2) π_{2p} (3) σ_{2p} (4) π^*_{2p}

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Q.5 Match the species in **List-I** with their geometry in **List-II**. [RE-NEET (UG) 2026]

List-I		List-II	
A.	PCl_5	I.	Tetrahedral
B.	BrF_5	II.	Square Planar
C.	BF_4^-	III.	Trigonal bipyramidal
D.	$[Ni(CN)_4]^{2-}$	IV.	Square pyramidal

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

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

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Q.6 Given below are two statements :

Statement-I: A hypothetical diatomic molecule with bond order zero is quite stable.

Statement-II: As bond order increases, the bond length increases.

In the light of the above statements, choose the most appropriate answer from the options given below: [NEET (UG) 2025]

(1) Statement-I is true but Statement-II is false

(2) Statement-I is false but Statement-II is true

(3) Both Statement-I and Statement-II are true

(4) Both Statement-I and Statement-II are false

Scan or tap for the full solution

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

List - I		List - II	
A.	XeO_3	I.	sp^3d; linear
B.	XeF_2	II.	sp^3; pyramidal
C.	$XeOF_4$	III.	sp^3d^3; distorted octahedral
D.	XeF_6	IV.	sp^3d^2; square pyramidal

Choose the correct answer from the options given below : [NEET (UG) 2025]

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

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

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Q.8 Identify the correct orders against the property mentioned

Choose the correct answer from the options given below:

A. $H_2O > NH_3 > CHCl_3$ - dipole moment

B. $XeF_4 > XeO_3 > XeF_2$ - number of lone pairs on central atom

C. O–H > C–H > N–O - bond length

D. $N_2 > O_2 > H_2$ - bond enthalpy [NEET (UG) 2025]

(1) A, C only (2) B, C only

(3) A, D only (4) B, D only

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Q.9 Match **List I** with **List II**.

List I (Molecule)		List II (Number and types of bond/s between two carbon atoms)	
A.	ethane	I.	one σ-bond and two π-bonds
B.	ethene	II.	two π-bonds
C.	carbon molecule, C_2	III.	one σ-bond
D.	ethyne	IV.	one σ-bond and one π-bond

Choose the correct answer from the options given below : [NEET (UG) 2024]

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

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

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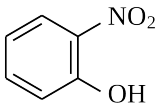
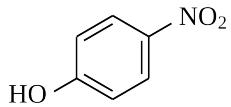
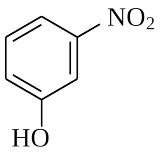
Q.10 Intramolecular hydrogen bonding is present in [NEET (UG) 2024]

(1) 

(2) 

(3) 

(4) HF

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Q.11 Match **List I** with **List II**.

List I (Compound)		List II (Shape/geometry)	
A.	NH_3	I.	Trigonal Pyramidal
B.	BrF_5	II.	Square Planar
C.	XeF_4	III.	Octahedral
D.	SF_6	IV.	Square Pyramidal

Choose the correct answer from the options given below: [NEET (UG) 2024]

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

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

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Q.12 Identify the correct answer. [NEET (UG) 2024]

(1) Three resonance structures can be drawn for ozone

(2) BF_3 has non-zero dipole moment

(3) Dipole moment of NF_3 is greater than that of NH_3

(4) Three canonical forms can be drawn for CO_3^{2-} ion

Scan or tap for the full solution

Q.13 Which of the following molecules has "NON ZERO" dipole moment value? [RE-NEET (UG) 2024]

(1) CCl_4 (2) HI (3) CO_2 (4) BF_3

Scan or tap for the full solution

Q.14 Identify the incorrect statement about PCl_5. [RE-NEET (UG) 2024]

(1) PCl_5 possesses two different Cl–P–Cl bond angles

(2) All five P–Cl bonds are identical in length

(3) PCl_5 exhibits sp^3d hybridisation

(4) PCl_5 consists of five P–Cl (sigma) bonds

Scan or tap for the full solution

Q.15 Match **List-I** with **List-II**:

List - I Molecule		List - II Bond enthalpy ($\mathrm{kJ\,mol^{-1}}$)	
A.	HCl	I.	435.8
B.	N_2	II.	498
C.	H_2	III.	946.0
D.	O_2	IV.	431.0

Choose the correct answer from the options given below: [RE-NEET (UG) 2024]

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

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

Scan or tap for the full solution

Q.16 Which of the following molecules is non-polar in nature? [NEET (UG) 2021]

(1) NO_2 (2) $POCl_3$ (3) CH_2O (4) $SbCl_5$

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Q.17 Amongst the following, the total number of species NOT having eight electrons around central atom in its outermost shell, is

NH_3, $AlCl_3$, $BeCl_2$, CCl_4, PCl_5 [NEET (UG) 2023]

(1) 2 (2) 4 (3) 1 (4) 3

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Q.18 The correct order of energies of molecular orbitals of N_2 molecule, is [NEET (UG) 2023]

(1) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

(2) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \sigma 2p_z < \sigma^* 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y)$

(3) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma 2p_z < \sigma^* 2p_z$

(4) $\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < \sigma 2p_z < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

Scan or tap for the full solution

Q.19 Amongst the following which one will have maximum 'lone pair - lone pair' electron repulsions? [NEET (UG) 2022]

(1) ClF_3 (2) IF_5 (3) SF_4 (4) XeF_2

Scan or tap for the full solution

Q.20 Which amongst the following is incorrect statement? [NEET (UG) 2022]

(1) The bond orders of O_2^+, O_2, O_2^- and O_2^{2-} are 2.5, 2, 1.5 and 1, respectively

(2) C_2 molecule has four electrons in its two degenerate π molecular orbitals

(3) H_2^+ ion has one electron

(4) O_2^+ ion is diamagnetic

Scan or tap for the full solution

Q.21 Match **List-I** with **List-II** :

List-I (Molecules)		List-II (Shape)	
a.	NH_3	i.	Square pyramidal
b.	ClF_3	ii.	Trigonal bipyramidal
c.	PCl_5	iii.	Trigonal pyramidal
d.	BrF_5	iv.	T-shape

Choose the correct answer from the options given below : [NEET (UG) 2022 (Phase 2)]

(1) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

(2) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

(3) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

(4) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

Scan or tap for the full solution

Q.22 The correct order of bond angles in the following compounds/species is : [NEET (UG) 2022 (Phase 2)]

(1) $CO_2 < NH_3 < H_2O < \overset{\oplus}{N}H_4$

(2) $H_2O < NH_3 < \overset{\oplus}{N}H_4 < CO_2$

(3) $H_2O < \overset{\oplus}{N}H_4 < NH_3 < CO_2$

(4) $H_2O < \overset{\oplus}{N}H_4 = NH_3 < CO_2$

Scan or tap for the full solution

Q.23 BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are : [NEET (UG) 2021]

(1) sp^2 and 8 (2) sp^3 and 4 (3) sp^3 and 6 (4) sp^2 and 6

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Q.24 Match **List - I** with **List - II** :

List - I		List - II	
a.	PCl_5	i.	Square pyramidal
b.	SF_6	ii.	Trigonal planar
c.	BrF_5	iii.	Octahedral
d.	BF_3	iv.	Trigonal bipyramidal

Choose the correct answer from the options given below. [NEET (UG) 2021]

(1) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

(2) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

(3) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

(4) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Scan or tap for the full solution

Q.25 Which of the following set of molecules will have zero dipole moment? [NEET (UG) 2020]

(1) Boron trifluoride, hydrogen fluoride, carbon dioxide, 1, 3-dichlorobenzene
(2) Nitrogen trifluoride, beryllium difluoride, water, 1, 3-dichlorobenzene
(3) Boron trifluoride, beryllium difluoride, carbon dioxide, 1, 4-dichlorobenzene
(4) Ammonia, beryllium difluoride, water, 1, 4-dichlorobenzene

Scan or tap for the full solution

Q.26 Identify a molecule which does not exist. [NEET (UG) 2020]

(1) Li_2 (2) C_2 (3) O_2 (4) He_2

Scan or tap for the full solution

Q.27 Which of the following diatomic molecular species has only π bonds according to Molecular Orbital Theory? [NEET (UG) 2019]

(1) C_2 (2) Be_2 (3) O_2 (4) N_2

Scan or tap for the full solution

Q.28 Consider the following species : CN^+, CN^-, NO and CN. Which one of these will have the highest bond order? [NEET 2018]

(1) NO (2) CN^- (3) CN^+ (4) CN

Scan or tap for the full solution

Q.29 In the structure of ClF_3, the number of lone pairs of electrons on central atom 'Cl' is [NEET 2018]

(1) one (2) two (3) four (4) three

Scan or tap for the full solution

Q.30 Which of the following pairs of compounds is isoelectronic and isostructural ? [NEET 2017]

(1) TeI_2, XeF_2 (2) IBr_2^-, XeF_2
(3) IF_3, XeF_2 (4) $BeCl_2$, XeF_2

Scan or tap for the full solution

Q.31 The species, having bond angles of 120° is [NEET 2017]

(1) ClF_3 (2) NCl_3 (3) BCl_3 (4) PH_3

Scan or tap for the full solution

Q.32 Which one of the following pairs of species have the same bond order ? [NEET 2017]

(1) O_2, NO^+ (2) CN^-, CO
(3) N_2, O_2^- (4) CO, NO

Scan or tap for the full solution

Q.33 Consider the molecules CH_4, NH_3 and H_2O. Which of the given statements is false? [NEET 2016 (Phase 1)]

(1) The H − O − H bond angle in H_2O is smaller than the H − N − H bond angle in NH_3.
(2) The H − C − H bond angle in CH_4 is larger than the H − N − H bond angle in NH_3.
(3) The H − C − H bond angle in CH_4, the H − N − H bond angle in NH_3, and the H − O − H bond angle in H_2O are all greater than 90°.
(4) The H − O − H bond angle in H_2O is larger than the H − C − H bond angle in CH_4.

Scan or tap for the full solution

Q.34 Predict the correct order among the following : [NEET 2016 (Phase 1)]

(1) bond pair - bond pair > lone pair - bond pair > lone pair - lone pair
(2) lone pair - bond pair > bond pair - bond pair > lone pair - lone pair
(3) lone pair - lone pair > lone pair - bond pair > bond pair - bond pair
(4) lone pair - lone pair > bond pair - bond pair > lone pair - bond pair

Scan or tap for the full solution

Q.35 Which one of the following compounds shows the presence of intramolecular hydrogen bond? [NEET 2016 (Phase 2)]

(1) H_2O_2
(2) HCN
(3) Cellulose
(4) Concentrated acetic acid

Scan or tap for the full solution

Q.36 The hybridizations of atomic orbitals of nitrogen in NO_2^+, NO_3^- and NH_4^+ respectively are [NEET 2016 (Phase 2)]

(1) sp, sp^3 and sp^2 (2) sp^2, sp^3 and sp
(3) sp, sp^2 and sp^3 (4) sp^2, sp and sp^3

Scan or tap for the full solution

Q.37 Which of the following pairs of ions is isoelectronic and isostructural? [NEET 2016 (Phase 2)]

(1) CO_3^{2-}, NO_3^- (2) ClO_3^-, CO_3^{2-}
(3) SO_3^{2-}, NO_3^- (4) ClO_3^-, SO_3^{2-}

Scan or tap for the full solution

Q.38 The correct geometry and hybridization for XeF_4 are [NEET 2016 (Phase 2)]

(1) octahedral, sp^3d^2
(2) trigonal bipyramidal, sp^3d
(3) planar triangle, sp^3d^3
(4) square planar, sp^3d^2

Scan or tap for the full solution

Q.39 Among the following, which one is a wrong statement ? [NEET 2016 (Phase 2)]
(1) PH_5 and $BiCl_5$ do not exist.
(2) $p\pi - d\pi$ bonds are present in SO_2.
(3) SeF_4 and CH_4 have same shape.
(4) I_3^+ has bent geometry.

Scan or tap for the full solution

Q.40 In which of the following pairs, both the species are not isostructural ? [AIPMT 2015]
(1) Diamond, Silicon carbide
(2) NH_3, PH_3
(3) XeF_4, XeO_4
(4) $SiCl_4$, PCl_4^+

Scan or tap for the full solution

Q.41 Decreasing order of stability of O_2, O_2^-, O_2^+ and O_2^{2-} is [AIPMT 2015]
(1) $O_2^{2-} > O_2^- > O_2 > O_2^+$
(2) $O_2 > O_2^+ > O_2^{2-} > O_2^-$
(3) $O_2^- > O_2^{2-} > O_2^+ > O_2$
(4) $O_2^+ > O_2 > O_2^- > O_2^{2-}$

Scan or tap for the full solution

Q.42 Which of the following pairs of ions are isoelectronic and isostructural ? [AIPMT 2015 (Cancelled)]
(1) SO_3^{2-}, NO_3^- (2) ClO_3^-, SO_3^{2-}
(3) CO_3^{2-}, SO_3^{2-} (4) ClO_3^-, CO_3^{2-}

Scan or tap for the full solution

Q.43 The correct bond order in the following species is [AIPMT 2015 (Cancelled)]
(1) $O_2^+ < O_2^- < O_2^{2+}$ (2) $O_2^- < O_2^+ < O_2^{2+}$
(3) $O_2^{2+} < O_2^+ < O_2^-$ (4) $O_2^{2+} < O_2^- < O_2^+$

Scan or tap for the full solution

Q.44 Which of the following options represents the correct bond order ? [AIPMT 2015 (Cancelled)]
(1) $O_2^- > O_2 < O_2^+$ (2) $O_2^- < O_2 > O_2^+$
(3) $O_2^- > O_2 > O_2^+$ (4) $O_2^- < O_2 < O_2^+$

Scan or tap for the full solution

Q.45 Maximum bond angle at nitrogen is present in which of the following ? [AIPMT 2015 (Cancelled)]
(1) NO_2^+ (2) NO_3^- (3) NO_2 (4) NO_2^-

Scan or tap for the full solution

Q.46 Which of the following species contains equal number of σ- and π-bonds ? [AIPMT 2015 (Cancelled)]
(1) $(CN)_2$ (2) $CH_2(CN)_2$
(3) HCO_3^- (4) XeO_4

Scan or tap for the full solution

Q.47 Which of the following molecules has the maximum dipole moment? [AIPMT 2014]
(1) CO_2 (2) CH_4 (3) NH_3 (4) NF_3

Scan or tap for the full solution

Q.48 Which one of the following species has plane triangular shape? [AIPMT 2014]
(1) N_3^- (2) NO_3^- (3) NO_2^- (4) CO_2

Scan or tap for the full solution

Q.49 XeF_2 is isostructural with [NEET 2013]
(1) $SbCl_3$ (2) $BaCl_2$ (3) TeF_2 (4) ICl_2^-

Scan or tap for the full solution

Q.50 Which of the following is a polar molecule? [NEET 2013]
(1) SiF_4 (2) XeF_4 (3) BF_3 (4) SF_4

Scan or tap for the full solution

Q.51 Which of the following is paramagnetic? [NEET 2013]
(1) CN^- (2) NO^+ (3) CO (4) O_2^-

Scan or tap for the full solution

Q.52 Which one of the following molecules contains no π bond? [NEET 2013]
(1) SO_2 (2) NO_2 (3) CO_2 (4) H_2O

Scan or tap for the full solution

Q.53 The pair of species that has the same bond order in the following is [NEET 2013 (Karnataka)]
(1) CO, NO^+ (2) NO^-, CN^-
(3) O_2, N_2 (4) O_2, B_2

Scan or tap for the full solution

Q.54 In which of the following pair both the species have sp^3 hybridization ? [NEET 2013 (Karnataka)]

(1) SiF_4, BeH_2 (2) NF_3, H_2O
(3) NF_3, BF_3 (4) H_2S, BF_3

Scan or tap for the full solution

Q.55 In which of the following ionization processes the bond energy increases and the magnetic behaviour changes from paramagnetic to diamagnetic. [NEET 2013 (Karnataka)]

(1) $O_2 \longrightarrow O_2^+$ (2) $C_2 \longrightarrow C_2^+$
(3) $NO \longrightarrow NO^+$ (4) $N_2 \longrightarrow N_2^+$

Scan or tap for the full solution

Q.56 During change of O_2 to O_2^- ion, the electron adds on which one of the following orbitals ? [AIPMT 2012 (Mains)]

(1) π^* orbital (2) π orbital (3) σ^* orbital (4) σ orbital

Scan or tap for the full solution

Q.57 Four diatomic species are listed below. Identify the correct order in which the bond order is increasing in them [AIPMT 2012 (Mains)]

(1) $NO < O_2^- < C_2^{2-} < He_2^+$
(2) $O_2^- < NO < C_2^{2-} < He_2^+$
(3) $C_2^{2-} < He_2^+ < O_2^- < NO$
(4) $He_2^+ < O_2^- < NO < C_2^{2-}$

Scan or tap for the full solution

Q.58 Which one of the following pairs is isostructural (i.e., having the same shape and hybridization) ? [AIPMT 2012 (Prelims)]

(1) [BCl_3 and $BrCl_3$] (2) [NH_3 and NO_3^-]
(3) [NF_3 and BF_3] (4) [BF_4^- and NH_4^+]

Scan or tap for the full solution

Q.59 Bond order of 1.5 is shown by [AIPMT 2012 (Prelims)]

(1) O_2^+ (2) O_2^- (3) O_2^{2-} (4) O_2

Scan or tap for the full solution

Q.60 Which of the following species contains three bond pairs and one lone pair around the central atom ? [AIPMT 2012 (Prelims)]

(1) H_2O (2) BF_3 (3) NH_2^- (4) PCl_3

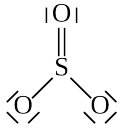
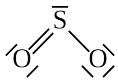
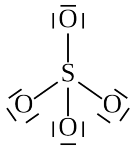
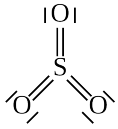
Scan or tap for the full solution

Q.61 The pair of species with the same bond order is [AIPMT 2012 (Prelims)]

(1) O_2^{2-}, B_2 (2) O_2^+, NO^+
(3) NO, CO (4) N_2, O_2

Scan or tap for the full solution

Q.62 Which of the following structures is the most preferred and hence of lowest energy for SO_3? [AIPMT 2011 (Mains)]

(1) 
(2) 
(3) 
(4) 

Scan or tap for the full solution

Q.63 The pairs of species of oxygen and their magnetic behaviours are noted below. Which of the following presents the correct description? [AIPMT 2011 (Mains)]

(1) O_2^-, O_2^{2-} – Both diamagnetic (2) O_2^+, O_2 – Both paramagnetic
(3) O, O_2^{2-} – Both paramagnetic (4) O^+, O_2^{2-} – Both paramagnetic

Scan or tap for the full solution

Q.64 Which of the following has the minimum bond length ? [AIPMT 2011 (Prelims)]

(1) O_2^+ (2) O_2^- (3) O_2^{2-} (4) O_2

Scan or tap for the full solution

Q.65 Which of the two ions from the list given below that have the geometry that is explained by the same hybridization of orbitals, NO_2^-, NO_3^-, NH_2^-, NH_4^+, SCN^-? [AIPMT 2011 (Prelims)]

(1) NO_2^- and NO_3^- (2) NH_4^+ and NO_3^-
(3) SCN^- and NH_2^- (4) NO_2^- and NH_2^-

Scan or tap for the full solution

Q.66 The correct order of increasing bond length of C–H, C–O, C–C and C=C is [AIPMT 2011 (Prelims)]

(1) C–H < C=C < C–O < C–C
(2) C–C < C=C < C–O < C–H
(3) C–O < C–H < C–C < C=C
(4) C–H < C–O < C–C < C=C

Scan or tap for the full solution

Q.67 The pairs of species of oxygen and their magnetic behavior are noted below. Which of the following presents the correct description? [AIPMT 2011 (Prelims)]

(1) O_2^-, O_2^{2-} - Both diamagnetic
(2) O^+, O_2^{2-} - Both paramagnetic
(3) O_2^+, O_2 - Both paramagnetic
(4) O, O_2^{2-} - Both paramagnetic

Scan or tap for the full solution

Q.68 Considering the state of hybridization of carbon atoms, find out the molecule among the following which is linear ? [AIPMT 2011 (Prelims)]

(1) $CH_3–CH=CH–CH_3$
(2) $CH_3–C\equiv C–CH_3$
(3) $CH_2=CH–CH_2–C\equiv CH$
(4) $CH_3–CH_2–CH_2–CH_3$

Scan or tap for the full solution

Q.69 Which of the following compounds has the lowest melting point? [AIPMT 2011 (Prelims)]

(1) $CaCl_2$ (2) $CaBr_2$ (3) CaI_2 (4) CaF_2

Scan or tap for the full solution

Q.70 In which of the following molecules the central atom does not have sp^3 hybridization? [AIPMT 2010 (Mains)]

(1) CH_4 (2) SF_4 (3) BF_4^- (4) NH_4^+

Scan or tap for the full solution

Q.71 Some of the properties of the two species, NO_3^- and H_3O^+ are described below. Which one of them is correct? [AIPMT 2010 (Mains)]

(1) Dissimilar in hybridization for the central atom with different structures.
(2) Isostructural with same hybridization for the central atom.
(3) Isostructural with different hybridization for the central atom.
(4) Similar in hybridization for the central atom with different structures.

Scan or tap for the full solution

Q.72 In which of the following pairs of molecules/ ions, the central atoms have sp^2 hybridisation ? [AIPMT 2010 (Prelims)]

(1) NO_2^- and NH_3 (2) BF_3 and NO_2^-
(3) NH_2^- and H_2O (4) BF_3 and NH_2^-

Scan or tap for the full solution

Q.73 Which one of the following species does not exist under normal conditions? [AIPMT 2010 (Prelims)]

(1) Be_2^+ (2) Be_2 (3) B_2 (4) Li_2

Scan or tap for the full solution

Q.74 In which one of the following species the central atom has the type of hybridization which is not the same as that present in the other three ? [AIPMT 2010 (Prelims)]

(1) SF_4 (2) I_3^- (3) $SbCl_5^{2-}$ (4) PCl_5

Scan or tap for the full solution

Q.75 The correct order of increasing bond angles in the following species is [AIPMT 2010 (Prelims)]

(1) $Cl_2O < ClO_2 < ClO_2^-$ (2) $ClO_2 < Cl_2O < ClO_2^-$
(3) $Cl_2O < ClO_2^- < ClO_2$ (4) $ClO_2^- < Cl_2O < ClO_2$

Scan or tap for the full solution

Q.76 What is the dominant intermolecular force or bond that must be overcome in converting liquid CH_3OH to a gas? [AIPMT 2009]

(1) Dipole-dipole interaction
(2) Covalent bonds
(3) London dispersion force
(4) Hydrogen bonding

Scan or tap for the full solution

Q.77 According to MO theory which of the lists ranks the nitrogen species in terms of increasing bond order ? [AIPMT 2009]

(1) $N_2^{2-} < N_2^- < N_2$ (2) $N_2 < N_2^{2-} < N_2^-$
(3) $N_2^- < N_2^{2-} < N_2$ (4) $N_2^- < N_2 < N_2^{2-}$

Scan or tap for the full solution

Q.78 In which of the following molecules/ions BF_3, NO_2^-, NH_2^- and H_2O, the central atom is sp^2 hybridised? [AIPMT 2009]

(1) NH_2^- and H_2O (2) NO_2^- and H_2O
(3) BF_3 and NO_2^- (4) NO_2^- and NH_2^-

Scan or tap for the full solution

Q.79 The energy absorbed by each molecule (A_2) of a substance is 4.4×10^{-19} J and bond energy per molecule is 4.0×10^{-19} J. The kinetic energy of the molecule per atom will be [AIPMT 2009]

(1) 2.2×10^{-19} J (2) 2.0×10^{-19} J
(3) 4.0×10^{-20} J (4) 2.0×10^{-20} J

Scan or tap for the full solution

Q.80 In the case of alkali metals, the covalent character decreases in the order [AIPMT 2009]

(1) MF > MCl > MBr > MI
(2) MF > MCl > MI > MBr
(3) MI > MBr > MCl > MF
(4) MCl > MI > MBr > MF

Scan or tap for the full solution

Q.81 Four diatomic species are listed below. Identify the correct order in which the bond order is increasing in them [AIPMT 2008]

(1) $NO < O_2^- < C_2^{2-} < He_2^+$
(2) $O_2^- < NO < C_2^{2-} < He_2^+$
(3) $C_2^{2-} < He_2^+ < O_2^- < NO$
(4) $He_2^+ < O_2^- < NO < C_2^{2-}$

Scan or tap for the full solution

Q.82 The correct order of increasing bond angles in the following triatomic species is [AIPMT 2008]

(1) $NO_2^+ < NO_2 < NO_2^-$ (2) $NO_2^+ < NO_2^- < NO_2$
(3) $NO_2^- < NO_2^+ < NO_2$ (4) $NO_2^- < NO_2 < NO_2^+$

Scan or tap for the full solution

Q.83 The angular shape of ozone molecule (O_3) consists of [AIPMT 2008]

(1) 1σ and 1π bond (2) 2σ and 1π bond
(3) 1σ and 2π bonds (4) 2σ and 2π bonds

Scan or tap for the full solution

Q.84 In which of the following pairs, the two species are isostructural? [AIPMT 2007]

(1) SO_3^{2-} and NO_3^- (2) BF_3 and NF_3
(3) BrO_3^- and XeO_3 (4) SF_4 and XeF_4

Scan or tap for the full solution

Q.85 The correct order of C–O bond length among CO, CO_3^{2-}, CO_2 is [AIPMT 2007]

(1) $CO < CO_3^{2-} < CO_2$ (2) $CO_3^{2-} < CO_2 < CO$
(3) $CO < CO_2 < CO_3^{2-}$ (4) $CO_2 < CO_3^{2-} < CO$

Scan or tap for the full solution

Q.86 Which of the following is not a correct statement? [AIPMT 2006]

(1) Multiple bonds are always shorter than corresponding single bonds.
(2) The electron-deficient molecules can act as Lewis acids.
(3) The canonical structures have no real existence.
(4) Every AB_5 molecule does in fact have square pyramid structure.

Scan or tap for the full solution

Q.87 Which of the following is not isostructural with $SiCl_4$? [AIPMT 2006]

(1) NH_4^+ (2) SCl_4 (3) SO_4^{2-} (4) PO_4^{3-}

Scan or tap for the full solution

Q.88 Which of the following species has a linear shape? [AIPMT 2006]

(1) O_3 (2) NO_2^- (3) SO_2 (4) NO_2^+

Scan or tap for the full solution

Q.89 The electronegativity difference between N and F is greater than that between N and H yet the dipole moment of NH_3 (1.5 D) is larger than that of NF_3 (0.2 D). This is because [AIPMT 2006]

(1) in NH_3 the atomic dipole and bond dipole are in the opposite directions whereas in NF_3 these are in the same direction
(2) in NH_3 as well as in NF_3 the atomic dipole and bond dipole are in the same direction
(3) in NH_3 the atomic dipole and bond dipole are in the same direction whereas in NF_3 these are in opposite directions
(4) in NH_3 as well as in NF_3 the atomic dipole and bond dipole are in opposite directions.

Scan or tap for the full solution

Q.90 In which of the following molecules are all the bonds not equal? [AIPMT 2006]

(1) NF_3 (2) ClF_3 (3) BF_3 (4) AlF_3

Scan or tap for the full solution

Q.91 Which of the following molecules has trigonal planar geometry? [AIPMT 2005]

(1) BF_3 (2) NH_3 (3) PCl_3 (4) IF_3

Scan or tap for the full solution

Q.92 The correct order in which the O–O bond length increases in the following is [AIPMT 2005]

(1) $O_2 < H_2O_2 < O_3$ (2) $O_3 < H_2O_2 < O_2$
(3) $H_2O_2 < O_2 < O_3$ (4) $O_2 < O_3 < H_2O_2$

Scan or tap for the full solution

Q.93 The correct sequence of increasing covalent character is represented by [AIPMT 2005]

(1) LiCl < NaCl < $BeCl_2$ (2) $BeCl_2$ < LiCl < NaCl

(3) NaCl < LiCl < $BeCl_2$ (4) $BeCl_2$ < NaCl < LiCl

Scan or tap for the full solution

Q.94 Which of the following would have a permanent dipole moment? [AIPMT 2005]

(1) SiF_4 (2) SF_4 (3) XeF_4 (4) BF_3

Scan or tap for the full solution

Q.95 Among the following, the pair in which the two species are not isostructural is [AIPMT 2004]

(1) SiF_4 and SF_4 (2) IO_3^- and XeO_3

(3) BH_4^- and NH_4^+ (4) PF_6^- and SF_6

Scan or tap for the full solution

Q.96 In a regular octahedral molecule, MX_6, the number of X − M − X bonds at 180° is [AIPMT 2004]

(1) three (2) two (3) six (4) four

Scan or tap for the full solution

Q.97 H_2O is dipolar, whereas BeF_2 is not. It is because [AIPMT 2004]

(1) the electronegativity of F is greater than that of O

(2) H_2O involves hydrogen bonding whereas BeF_2 is a discrete molecule

(3) H_2O is linear and BeF_2 is angular

(4) H_2O is angular and BeF_2 is linear.

Scan or tap for the full solution

Q.98 In BrF_3 molecule, the lone pairs occupy equatorial positions to minimize [AIPMT 2004]

(1) lone pair - bond pair repulsion only

(2) bond pair - bond pair repulsion only

(3) lone pair - lone pair repulsion and lone pair - bond pair repulsion

(4) lone pair - lone pair repulsion only.

Scan or tap for the full solution

Q.99 Which one of the following statements is not correct for sigma- and pi- bonds formed between two carbon atoms? [AIPMT 2003]

(1) sigma-bond is stronger than a pi-bond.

(2) Bond energies of sigma- and pi-bonds are of the order of 264 kJ/mol and 347 kJ/mol, respectively

(3) Free rotation of atoms about a sigma-bond is allowed but not in case of a pi-bond.

(4) Sigma-bond determines the direction between carbon atoms but a pi-bond has no primary effect in this regard.

Scan or tap for the full solution

Q.100 Which of the following has pπ − dπ bonding? [AIPMT 2002]

(1) NO_3^- (2) SO_3^{2-} (3) BO_3^{3-} (4) CO_3^{2-}

Scan or tap for the full solution

Q.101 In NO_3^- ion number of bond pair and lone pair of electrons on nitrogen atom are [AIPMT 2002]

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

Scan or tap for the full solution

Q.102 Main axis of a diatomic molecule is z, atomic orbitals p_x and p_y overlap to form which of the following orbitals. [AIPMT 2001]

(1) π molecular orbital (2) σ molecular orbital

(3) δ molecular orbital (4) No bond will form

Scan or tap for the full solution

Q.103 Which of the following two are isostructural? [AIPMT 2001]

(1) XeF_2, IF_2^- (2) NH_3, BF_3

(3) CO_3^{2-}, SO_3^{2-} (4) PCl_5, ICl_5

Scan or tap for the full solution

Q.104 In which of the following bond angle is maximum ? [AIPMT 2001]

(1) NH_3 (2) NH_4^+ (3) PCl_3 (4) SCl_2

Scan or tap for the full solution

Q.105 In X–H···Y, X and Y both are electronegative elements. Then [AIPMT 2001]

(1) electron density on X will increase and on H will decrease

(2) in both electron density will increase

(3) in both electron density will decrease

(4) on X electron density will decrease and on H will increase.

Scan or tap for the full solution

Q.106 dπ − pπ bond present in [AIPMT 2000]

(1) CO_3^{2-} (2) PO_4^{3-} (3) NO_3^- (4) NO_2^-

Scan or tap for the full solution

Q.107 Right order of dissociation energy N_2 and N_2^+ is [AIPMT 2000]

(1) $N_2 > N_2^+$ (2) $N_2 = N_2^+$

(3) $N_2^+ > N_2$ (4) none

Scan or tap for the full solution

Q.108 Which species does not exhibit paramagnetism? [AIPMT 2000]

(1) N_2^+ (2) O_2^- (3) CO (4) NO

Scan or tap for the full solution

Q.109 Which compound forms linear polymer due to H-bond? [AIPMT 2000]

(1) H_2O (2) NH_3 (3) HF (4) HCl

Scan or tap for the full solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	**2**	**4**	**1**	**1**	**3**	**4**	**3**
Ques.	8	9	10	11	12	13	14
Ans.	**3**	**3**	**1**	**1**	**4**	**2**	**2**
Ques.	15	16	17	18	19	20	21
Ans.	**4**	**4**	**4**	**4**	**4**	**4**	**3**
Ques.	22	23	24	25	26	27	28
Ans.	**2**	**4**	**2**	**3**	**4**	**1**	**2**
Ques.	29	30	31	32	33	34	35
Ans.	**2**	**2**	**3**	**2**	**4**	**3**	**3**
Ques.	36	37	38	39	40	41	42
Ans.	**3**	**1, 4**	**1**	**3**	**3**	**4**	**2**
Ques.	43	44	45	46	47	48	49
Ans.	**2**	**4**	**1**	**4**	**3**	**2**	**4**
Ques.	50	51	52	53	54	55	56
Ans.	**4**	**4**	**4**	**1**	**2**	**3**	**1**
Ques.	57	58	59	60	61	62	63
Ans.	**4**	**4**	**2**	**4**	**1**	**4**	**2**
Ques.	64	65	66	67	68	69	70
Ans.	**1**	**1**	**1**	**3**	**2**	**3**	**2**
Ques.	71	72	73	74	75	76	77
Ans.	**1**	**2**	**2**	**3**	**4**	**4**	**1**
Ques.	78	79	80	81	82	83	84
Ans.	**3**	**4**	**3**	**4**	**4**	**2**	**3**
Ques.	85	86	87	88	89	90	91
Ans.	**3**	**4**	**2**	**4**	**3**	**2**	**1**
Ques.	92	93	94	95	96	97	98
Ans.	**4**	**3**	**2**	**1**	**1**	**4**	**4**
Ques.	99	100	101	102	103	104	105
Ans.	**2**	**2**	**4**	**1**	**1**	**2**	**1**
Ques.	106	107	108	109			
Ans.	**2**	**1**	**3**	**3**			