

DPP No. # B1(JEE-MAIN)

Total Marks : 64

Max. Time : 40 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.16

(3 marks, 2 min.)

[48, 32]

ChemINFO : 4 Questions ('-1' negative marking) Q.17 to Q.20

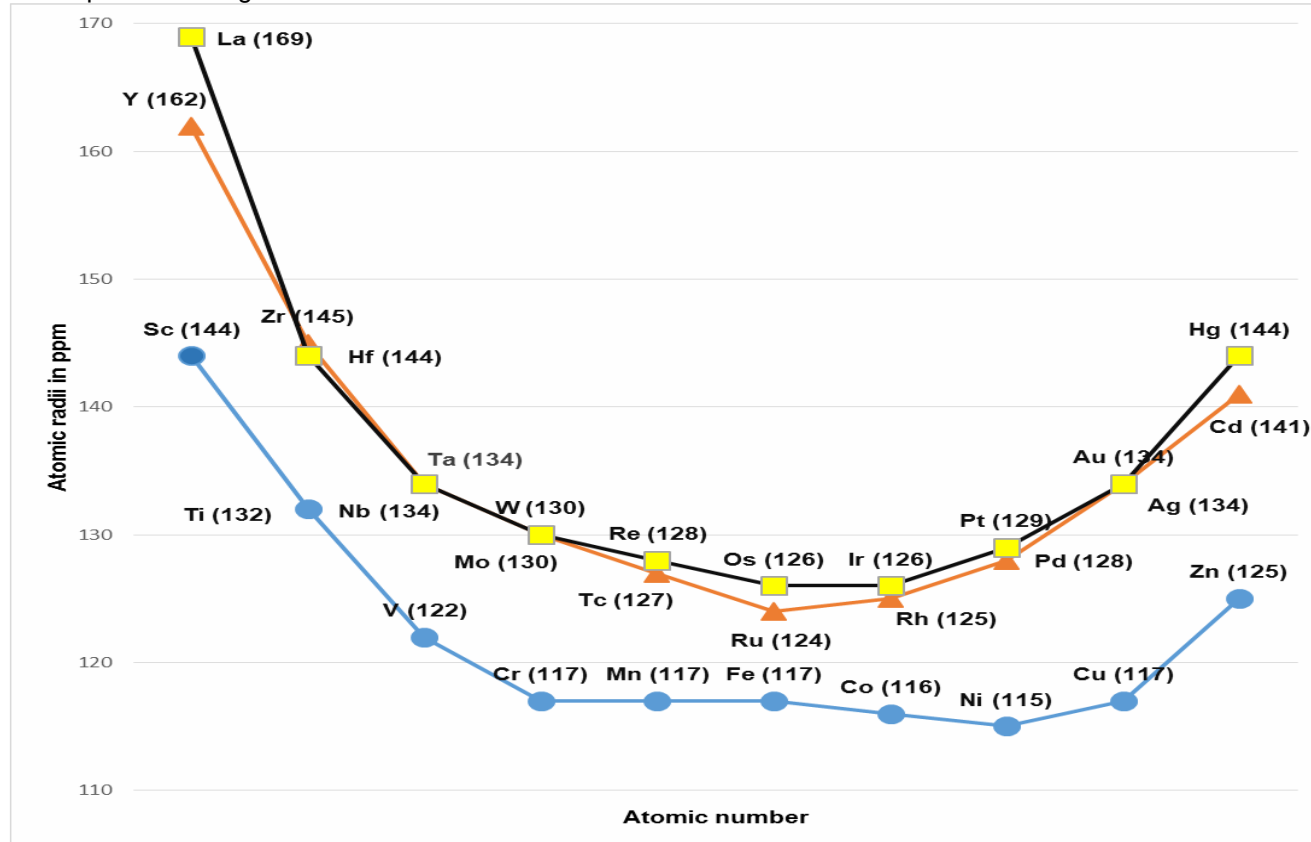
(4 marks, 2 min.)

[16, 08]

- The number of d-electrons in Fe^{2+} is not equal to that of the :
(A) d-electrons in Fe (Atomic number = 26) (B) p-electrons in Ne (Atomic number = 10)
(C) p-electrons in Cl^- (Atomic number = 17) (D) d-electrons in Co^{3+} (Atomic number = 27)
- Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii ? (Numbers in the parenthesis are atomic numbers).
(A) Zr (40) and Nb (41) (B) Zr (40) and Hf (72)
(C) Zr (40) and Ta (73) (D) Ti (22) and Zr (40)
- Which of the following electronic configuration represent noble gas ?
(A) ns^2np^6 (B) ns^2np^5 (C) ns^2np^4 (D) ns^2np^3
- Which of the following group of transition metals is called coinage metals ?
(A) Cu, Ag, Au (B) Ru, Rh, Pd (C) Fe, Co, Ni (D) Os, Ir, Pt
- Outermost configuration for $Z = 25$ is :
(A) $4s^2, 3d^5$ (B) $5s^2, 4d^5$ (C) $4s^2, 3d^3$ (D) $4s^2, 3d^1$
- Atomic number of Ni and Cu are 28 and 29 respectively. Electronic configuration $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}$ shows :
(A) Ni (B) Ni^{2+} (C) Cu^{2+} (D) Cu^+
- Which group of atoms have nearly same atomic radius :
(A) Na, K, Rb, Cs (B) Li, Be, B, C (C) Fe, Co, Mn (D) F, Cl, Br, I
- For the valence electron of the following element which is the correct decreasing order of Z_{eff} :
(A) $\text{Be} > \text{B} > \text{C} > \text{N}$ (B) $\text{N} > \text{C} > \text{B} > \text{Be}$ (C) $\text{Be} > \text{N} > \text{C} > \text{B}$ (D) $\text{N} > \text{Be} > \text{B} > \text{C}$
- Which of the following element as configuration $[\text{Ar}] 4s^2 3d^1$
(A) Cu (B) Sc (C) Ni (D) Pt
- The first ionisation enthalpies of Na, Mg, Al and Si are in the order :
(A) $\text{Na} < \text{Mg} > \text{Al} < \text{Si}$ (B) $\text{Na} > \text{Mg} > \text{Al} > \text{Si}$ (C) $\text{Na} < \text{Mg} < \text{Al} < \text{Si}$ (D) $\text{Na} > \text{Mg} > \text{Al} < \text{Si}$
- An atom with which of the following electronic configuration has the lowest first ionisation enthalpy among the following :
(A) $1s^2 2s^2 2p^5$ (B) $1s^2 2s^2 2p^3$ (C) $1s^2 2s^2 2p^6 3s^1$ (D) $1s^2 2s^2 2p^6$
- If the value of IE_1 for He-atom is 24.6 eV, then the energy required for the reaction :
 $\text{He}(\text{g}) \longrightarrow \text{He}^{2+}(\text{g}) + 2\text{e}^-$ is :
(A) 79 eV (B) 38.2 eV
(C) 147 eV (D) Cannot be determined since data is insufficient.
- The correct sequence of the ionic radius of the following is :
(A) $\text{Br}^- > \text{Cl}^- > \text{S}^{2-} > \text{O}^{2-} > \text{F}^-$ (B) $\text{Br}^- > \text{S}^{2-} > \text{Cl}^- > \text{O}^{2-} > \text{F}^-$
(C) $\text{Br}^- > \text{S}^{2-} > \text{Cl}^- > \text{F}^- > \text{O}^{2-}$ (D) $\text{S}^{2-} > \text{Br}^- > \text{Cl}^- > \text{O}^{2-} > \text{F}^-$
- Which is correct trend of ionisation energy ?
(A) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$ (B) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{O} < \text{F} < \text{N} < \text{Ne}$
(C) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$ (D) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$
- Which of the following atoms has the highest first ionization energy ?
(A) Na (B) K (C) Li (D) Rb
- Which of the following have less ionisation energy than oxygen ?
(A) F (B) B (C) N (D) Ne



As we move along the lanthanoid series, the nuclear charge increases by one unit at each successive element. The new electron is added into the same subshell (4f). As a result, the attraction on the electrons by the nucleus increases and this tends to decrease the size. Further, as the new electron is added into the f-subshell, there is imperfect shielding of one electron by another in this subshell due to the shapes of these f-orbitals. This imperfect shielding is unable to counterbalance the effect of the increased nuclear charge. Hence, the net result is a contraction in the size. Thus covalent and ionic radii of Nb (5th period) and Ta (6th period) are approx equal due to poor shielding of f orbital electrons.



Ti < Zr ≈ Hf (Lanthanide Contraction)
Sc < Y < La

Memorize this theory as soon as you get the DPP. Revise it regularly and master this concept by practice.

- Which of the following correct order of size :
(A) V < Nb < Ta (B) V < Nb < Ta (C) V < Nb = Ta (D) V = Nb < Ta
- Which of the following element has highest size :
(A) W (B) Y (C) Zr (D) Fe
- Which of the following statement is correct :
(A) Due to lanthanide contraction size of 3d series elements ≈ 4d series element .
(B) Due to lanthanide contraction size of 4d series elements ≈ 5d series element.
(C) Due to lanthanide contraction size of 3d series elements < 5d series element.
(D) Due to lanthanide contraction size of 5d series element > 4d series elements.
- Which of the following factors may be regarded as the main cause of lanthanide contraction ?
(A) Greater shielding of 5d electrons by 4f electrons.
(B) Poorer shielding of 5d electrons by 4f electrons.
(C) Effective shielding of one of 4f electrons by another in the sub-shell.
(D) Poor shielding of one of 4f electron by another in the sub-shell.

DPP No. # B2 (JEE- ADVANCED)

Total Marks : 44

Max. Time : 28 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.5

(4 marks, 2 min.)

[20, 10]

Integer type Questions ('-1' negative marking) Q.6 to Q.9

(4 marks, 3 min.)

[16, 12]

Match the Following (no negative marking) Q.10

(8 marks, 6 min.)

[08, 06]

- 1.* In which of the following reaction size of product ion is less than initial atom/ion ?
 (A) $\text{Ne(g)} + e^- \rightarrow \text{Ne}^- (\text{g})$ (B) $\text{Na(g)} \rightarrow \text{Na}^+ (\text{g}) + e^-$
 (C) $\text{O}^{2-} (\text{g}) \rightarrow \text{O}^- (\text{g}) + e^-$ (D) $\text{Mg}^{++} (\text{g}) + e^- \rightarrow \text{Mg}^+ (\text{g})$
- 2.* Which of the following statements is/are correct for mononuclear isoelectronic species :
 (A) They have same number of electrons.
 (B) They have different number of protons.
 (C) Their ionic radii decreases with increase in nuclear charge.
 (D) They have same ionic radii due to same number of filled shells.
- 3.* Poor shielding of nuclear charge by d or f – orbital electrons is responsible for which of the following facts :
 (A) Atomic radius of Nb (4-d series) is comparable to that of Ta (5-d series)
 (B) The 1st ionisation energy of copper is less than that of Zinc
 (C) Atomic radius of Al and Ga are nearly same.
 (D) The 1st ionisation energy for Au is greater than that of Ag.
- 4.* The ionization potential order for which set is correct :
 (A) $\text{Li} > \text{K} > \text{Cs}$ (B) $\text{B} > \text{Li} > \text{K}$ (C) $\text{Cs} > \text{Li} > \text{B}$ (D) $\text{Cs} < \text{Li} < \text{K}$
- 5.* Which of the following elements have approx similar atomic radii :
 (A) Sc (B) Fe (C) Ni (D) Cu
6. The five successive ionisation energies for an atom X are 800, 2425, 3660, 25025 and 32800 KJ/mole respectively. what are the number of valence electrons in and atom X.
7. In the given, how many atoms have greater first ionisation energies than Boron ?
 Li Be C N O F He
8. Find out the total numbers of ions/atoms having greater radii than oxygen atom.
 Al^{3+} , Mg^{2+} , S^{2-} , O^{2-} , F^- , Br^- , I^- , F, C
9. How many number of unpaired number of electrons present in phosphorous :
10. Which of the following options is not correctly matched :

	(Element / elements)		(IUPAC group number in Modern periodic table)
(A)	An element whose fourth shell contains two p-electrons	(p)	14 th group
(B)	An element whose valence shell contains one unpaired p-electron	(q)	17 th group
(C)	An element which receives last electron in (n – 1) d-subshell	(r)	8 th group
(D)	An element with the ground-state electron configuration $[\text{Ar}]4s^23d^{10}$	(s)	10 th group

DPP No. # B3 (JEE-MAIN)

Total Marks : 60

Max. Time : 40 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.20

(3 marks, 2 min.)

[60, 40]

- The chemical name of NaAlO_2 is :
(A) Sodium Aluminite (B) Sodium Metaaluminate
(C) Sodium pyroaluminate (D) Sodium hypoaluminate
- ~~2.~~ In which of the following chemical name is not correctly matched with chemical formula ?

Chemical Formula	Chemical Name	Chemical Formula	Chemical Name
(A) NaN_3	Sodium azide	(B) $\text{Ba}(\text{NO}_2)_2$	Barium Nitrite
(C) HIO_4	Iodic Acid	(D) H_2SiO_3	Meta Silicic Acid
- The chemical name of $\text{Mg}(\text{ClO}_3)_2$ is -
(A) Magnesium chlorite (B) Magnesium perchlorate
(C) Magnesium chlorate (D) Magnesium chloride
- The chemical name of $\text{Ca}(\text{ClO}_2)_2$ is -
(A) Calcium chloride (B) Calcium chlorite (C) Calcium chlorate (D) Calcium perchlorate
- ~~5.~~ The chemical name of BaCrO_4 is :
(A) Barium metachromite (B) Barium chromite
(C) Barium dichromate (D) Barium chromate
- The chemical name of K_2MnO_4 is -
(A) Potassium permanganate (B) Potassium manganate
(C) Potassium metamanganate (D) Potassium manganite
- The chemical name of $\text{Co}(\text{BO}_2)_2$ is -
(A) Cobalt (II) metaborate (B) Cobalt (II) orthoborate
(C) Cobalt (III) metaborate (D) Cobalt (II) Pyroborate
- The chemical formula of Potassium superoxide is
(A) K_2O_2 (B) K_2O (C) KO_2 (D) KO_3
- ~~9.~~ The chemical formula of Phosphorous acid is -
(A) H_3PO_4 (B) H_3PO_3 (C) H_3PO_2 (D) H_2PO_3
- The chemical formula of Pyrosulphuric acid is -
(A) $\text{H}_2\text{S}_2\text{O}_7$ (B) $\text{H}_2\text{S}_2\text{O}_5$ (C) $\text{H}_2\text{S}_2\text{O}_6$ (D) $\text{H}_2\text{S}_2\text{O}_4$
- ~~11.~~ Pb has stable oxidation state :
(A) +4 (B) +2 (C) +3 (D) +6
- Cr has stable oxidation state :
(A) +4 (B) +2 (C) +3 (D) +6
- ~~13.~~ In NaIO oxidation number of Iodine is :
(A) +4 (B) +2 (C) +3 (D) +1
- Which of the following has stable oxidation state zero -
(A) Na (B) N (C) Pb (D) F
- With respect to oxygen maximum oxidation state is shown by :
(A) Halogen family (B) oxygen family (C) nitrogen family (D) Boron family
- Correct name is written against which of the following chemical formulae ?

(A) CaSe_2O_7	Calcium pyroselenate	(B) $\text{Ni}(\text{HSO}_3)_2$	Nickel(II) metasulphite
(C) $\text{Sr}(\text{PO}_3)_2$	Stronsium phosphate	(D) CsOBr	Cesium bromite
- Which of following anion has pyro-prefix :
(A) $\text{S}_2\text{O}_7^{2-}$ (B) SO_5^{2-} (C) $\text{S}_2\text{O}_8^{2-}$ (D) SO_3^{2-}
- What is the formula of aluminium arsenite :
(A) $\text{Al}(\text{AsO}_3)$ (B) $\text{Al}(\text{AsO}_4)$ (C) AlAsO_5 (D) AlAsO_4

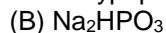
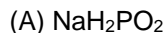
19. Match the column:

	Formulas of anion		Name
(P)	hypophosphite ion	(a)	$P_2O_7^{4-}$
(Q)	Pyrophosphate ion	(b)	$(PO_3^-)_3$
(R)	Metaphosphate ion	(c)	$H_2PO_2^-$
(S)	Orthophosphate ion	(d)	PO_4^{3-}

	P	Q	R	S
(A)	c	a	b	d
(C)	b	c	a	d

	P	Q	R	S
(B)	a	b	c	d
(D)	d	c	a	b

20. What is the formula of sodium hypophosphite.

**DPP No. # B4 (REVISION DPP)**

Total Marks : 44

Max. Time : 28 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.5

(4 marks, 2 min.)

[20, 10]

Integer type Questions ('-1' negative marking) Q.6 to Q.9

(4 marks, 3 min.)

[16, 12]

Match the Following (no negative marking) Q.10

(8 marks, 6 min.)

[08, 06]

1.* The properties which are common to both groups 1 and 17 elements in the periodic table are :

- (A) Electropositive character increases down the groups.
 (B) Reactivity decreases from top to bottom in these groups.
 (C) Atomic radii increases as the atomic number increases.
 (D) Electronegativity decreases on moving down a group.

2.* Which of the following have more ionisation energy than oxygen ?

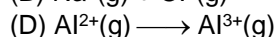
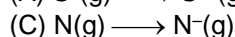
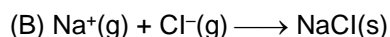
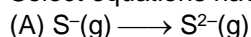
(A) F

(B) B

(C) N

(D) C

3.* Select equations having endothermic step :



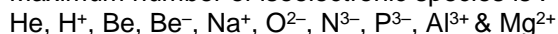
4.* Ionization energy of an element is :

- (A) Equal in magnitude but opposite in sign to the electron gain enthalpy of the cation of the element
 (B) Same as electron affinity of the element
 (C) Energy required to remove one valence electron from an isolated gaseous atom in its ground state
 (D) Equal in magnitude but opposite in sign to the electron gain enthalpy of the anion of the element

5.* Which of the following statements is/are correct?

- (A) The second ionization enthalpy of oxygen element is greater than that of fluorine element.
 (B) The first ionization enthalpy of phosphorus is greater than that of aluminium.
 (C) The first ionization enthalpy of aluminium is slightly greater than that of gallium.
 (D) The first ionization enthalpy of copper is less than that of gold.

6.* Maximum number of isoelectronic species is :



7.* In the following elements (atomic number is given), how many elements belong to d-block ?

12, 19, 17, 25, 31, 42, 54, 23, 38

8. If oxidation state of Cl atom in $HClO_4$ (perchloric acid) is +X, write the value of X.

9.* An element has highest negative electron gain enthalpy in periodic table. In its outer most shell total number of electrons are x and it has total p-electrons y. What will be the value of y-x.

10. Match the column:

	Column-I		Column-II
(A)	Increasing order of ionisation energy	(p)	$F < O < S < Se$
(B)	Increasing order of electron affinity	(q)	$O < N < F < Ne$
(C)	Increasing order of atomic size	(r)	$Na < Mg < Al < Si$
(D)	Increasing order of Z_{eff} .	(s)	$O^2 < O^- < O < O^+$


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DPP No. # B5 (JEE-MAIN)

Total Marks : 60

Max. Time : 40 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.20

(3 marks, 2 min.)

[60, 40]

- Electrovalent bond formation depends on
(A) Ionization energy (B) Electron affinity (C) Lattice energy (D) All the three above
- In the given bonds which one is most ionic
(A) Cs-Cl (B) Li-Cl (C) C-Cl (D) H-Cl
- Which of the following is an electrovalent linkage
(A) CH₄ (B) MgCl₂ (C) SiCl₄ (D) BF₃
- Molten sodium chloride conducts electricity due to the presence of
(A) Free electrons (B) Free ions
(C) Free molecules (D) Atoms of sodium and chlorine
- When metals combine with non-metals, the metal atom tends to
(A) Lose electrons (B) Gain electrons
(C) Remain electrically neutral (D) None of these
- Which of the following compounds is ionic
(A) KI (B) CH₄ (C) Diamond (D) H₂
- Indicate the nature of bonding in CCl₄ and CaH₂
(A) Covalent in CCl₄ and electrovalent in CaH₂ (B) Electrovalent in both CCl₄ and CaH₂
(C) Covalent in both CCl₄ and CaH₂ (D) Electrovalent in CCl₄ and covalent in CaH₂
- Which of the following compounds are covalent
(A) H₂ (B) CaO (C) KCl (D) Na₂S
- The nature of bonding in graphite is
(A) Covalent (B) Ionic (C) Metallic (D) Coordinate
- Which type of compounds show high melting and boiling points
(A) Electrovalent compounds
(B) Covalent compounds
(C) Coordinate compounds
(D) All the three types of compounds have equal melting and boiling points
- Octet configuration can be achieved through :
(A) loss of electrons (B) gain of electrons (C) sharing of electrons (D) All of these
- What is the nature of chemical bonding between Cs and F ?
(A) Ionic (B) Covalent (C) Coordinate (D) Metallic
- Which of the following species does not obey octet rule :
(A) SiF₄ (B) PCl₅ (C) ICl (D) BF₄⁻
- The molecule without any lone pair around the central atom is :
(A) XeO₃ (B) XeO₄ (C) XeF₆ (D) XeO₂F₂
- Which forms a crystal of NaCl ?
(A) NaCl molecules (B) Na⁺ and Cl⁻ ions (C) Na and Cl atoms (D) None of these
- Which one of the following pairs of elements is most likely to form an ionic compound?
(A) B and Cl₂ (B) K and O₂ (C) O₂ and Cl₂ (D) Al and I₂
- Example of super octet molecule is :
(A) SF₆ (B) PCl₅ (C) IF₇ (D) All of these

18. The number of electrons involved in the bond formation in N_2 molecule is :
 (A) 2 (B) 4 (C) 10 (D) 6
19. The octet rule is not obeyed in :
 (A) CO_2 (B) BCl_3 (C) PCl_5 (D) (B) and (C) both
20. In which of the following acid suffix name used is "ic" acid.
 (A) HNO_2 (B) H_3PO_3 (C) H_3PO_2 (D) $HClO_4$

DPP No. # B6 (JEE-ADVANCED)

Total Marks : 39

Max. Time : 25 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.5

(4 marks, 2 min.)

[20, 10]

Integer type Questions ('-1' negative marking) Q.6 to Q.9

(4 marks, 3 min.)

[16, 12]

Match Listing (-1 negative marking) Q.10

(3 marks, 3 min.)

[03, 03]

- 1.* Resonating structures can have same :
 (A) Atomic arrangements (B) Electronic arrangements
 (C) Total charge (D) Sigma bond
- 2.* The molecule with lone pair around the central atom is :
 (A) XeO_3 (B) XeO_4 (C) XeF_6 (D) XeO_2F_2
- 3.* π bond results due to overlap of :
 (A) d_{xy} and p_y along x-axis (B) $d_{x^2-y^2}$ and p_y along x-axis
 (C) d_{xy} and p_x along y-axis (D) $d_{x^2-y^2}$ and p_y along y-axis
- 4.* Which of the following Lewis diagram is/are correct ?
 (A) $Na^+ [:\ddot{O} - \ddot{Cl}:]^-$ (B) $:\ddot{Cl} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{C}} - \ddot{Cl}:$ (C) $:\ddot{O} : C :: \ddot{O} :$ (D) $H - \overset{\cdot\cdot}{\underset{\cdot\cdot}{N}} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{N}} - H$
- 5.* The incorrect order of increasing bond order :
 (A) $CO < CO_2 < CO_3^{2-}$ (C-O bond) (B) $CN^- < NCN^{2-} < R-\overset{\overset{NH}{||}}{C}-NH_2$ (C-N bond)
 (C) $ClO^- < ClO_2^- < ClO_3^- < ClO_4^-$ (Cl-O bond) (D) $SO_2 < SO_4^{2-} < SO_3^{2-}$ (S-O bond)
6. The total number of lone pairs in chlorate ion is :
7. In how many of the following species the central atom has two lone pairs of electrons ?
 XeF_4 ClF_3 F_2SeO_2 XeF_3^+ NH_2^- $ClOF_3$
 ICl_4^- SCl_2 $XeOF_2$
8. In how many of the given species there is no lone pair on the central atom.
 (i) XeF_4 (ii) NH_3 (iii) SO_2 (iv) NO_3^- (v) O_3
 (vi) $XeOF_4$ (vii) ICl_3 (viii) IF_7 (ix) SO_4^{2-} (x) XeO_3
9. What is the formal charge on Xe atom in XeF_4 .
- 10.* Match the species in column (I) with their characteristics in column (II) :

	Column-I		Column-II
(P)	BH_4^-	(1)	2 bond pair and 3 lone pair on central atom
(Q)	ICl_2^+	(2)	4 bond pair and no lone pair on central atom
(R)	ICl_2^-	(3)	3 bond pair and 1 lone pair on central atom
(S)	ICl_4^-	(4)	2 bond pair and 2 lone pair on central atom
		(5)	4 bond pair and 2 lone pair on central atom

(A) P = 2; Q = 4; R = 3; S = 1
 (C) P = 2; Q = 1; R = 5; S = 4

(B) P = 2; Q = 4; R = 1; S = 5
 (D) P = 2; Q = 1; R = 3; S = 4

DPP No. # B7 (JEE-MAIN)

Total Marks : 45

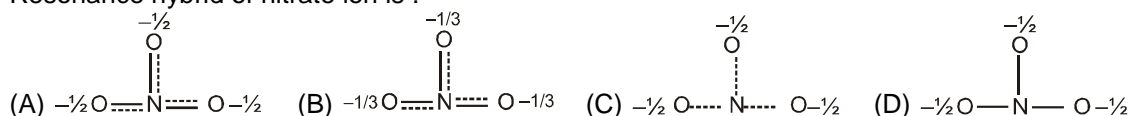
Max. Time : 30 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.15

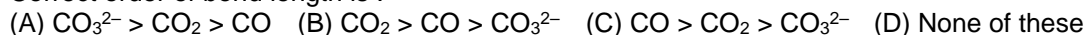
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[45, 30]

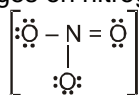
1. ✖ Resonance hybrid of nitrate ion is :



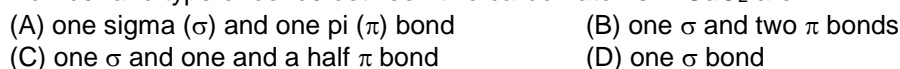
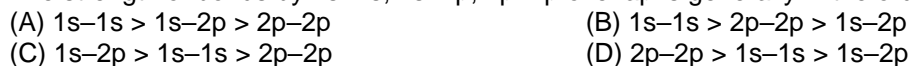
2. Correct order of bond length is :



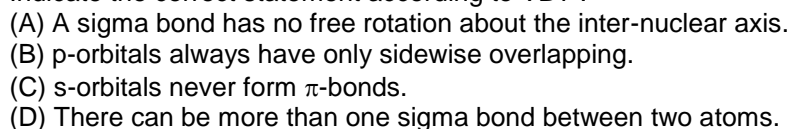
3. What is the formal charges on nitrogen atom in the given species :



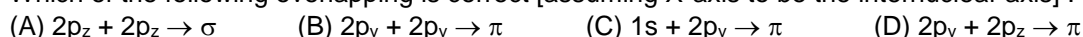
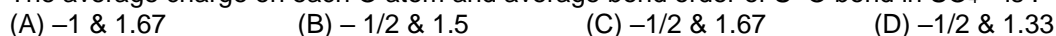
4. What is the correct order from the weakest to the strongest carbon-oxygen bond for the following species ?

5. Number and type of bonds between two carbon atoms in CaC_2 are :6. ✖ The strength of bonds by $1s-1s$, $1s-2p$, $2p-2p$ overlap is generally in the order :

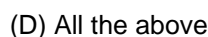
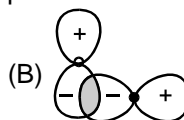
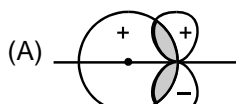
7. Indicate the correct statement according to VBT :



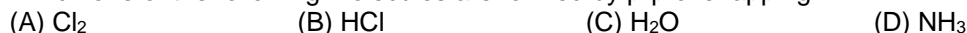
8. Which of the following overlapping is correct [assuming X-axis to be the internuclear axis] :

9. ✖ The average charge on each O atom and average bond order of S-O bond in SO_4^{2-} is :

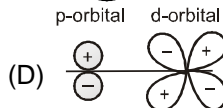
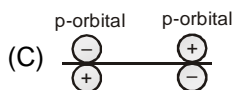
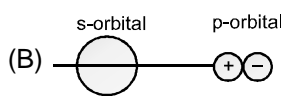
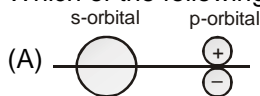
10. ✖ Which of the following orbital overlappings is not possible in bond formation according to VBT.



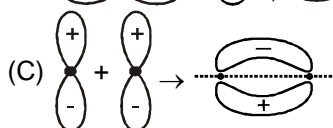
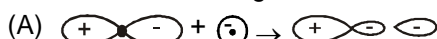
11. Which one of the following molecules are formed by p-p overlapping ?



12. ✖ Which of the following leads to bonding ?



13. Which of the following combination of orbitals is correct ?



14. Total number of bond pair of electrons and lone pair of electrons in CO_2 are-

- (A) 2, 8 (B) 4, 4 (C) 4, 7 (D) 3, 6

15. Which of the following statement is correct ?

- (A) Octet rule is followed by N in NO_2 .
 (B) BF_3 is hypervalent species and PF_5 is hypovalent species.
 (C) SO_3 does not follow octet rule.
 (D) BCl_3 has lone pair of electrons on boron.

DPP No. # B8 (JEE-MAIN)

Total Marks : 45

Max. Time : 30 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.15

(3 marks, 2 min.)

[45, 30]

- In which of the following, 'N' atom is sp^2 hybridised :
 (A) NH_3 (B) NH_4^+ (C) NH_2^- (D) NOCl
- The hybridization of carbon atoms in $\text{C}_2\text{--C}_3$ single bond of $\text{HC} \equiv \text{C} - \text{CH} = \text{CH}_2$ is :
 (A) $\text{sp}^3 - \text{sp}^3$ (B) $\text{sp}^2 - \text{sp}$ (C) $\text{sp} - \text{sp}^2$ (D) $\text{sp}^3 - \text{sp}$
- In C_3O_2 , the hybridization state of carbon is :
 (A) sp (B) sp^2 (C) sp^3 (D) sp and sp^2 both
- Carbon atoms in $\text{C}_2(\text{CN})_2$ are :
 (A) All sp -hybridised (B) All sp^2 -hybridised (C) All sp^3 -hybridised (D) sp and sp^2 -hybridised.
- $\text{BF}_3 + \text{F}^- \rightarrow \text{BF}_4^-$
 What is the hybridization state of B in BF_3 and BF_4^- :
 (A) sp^2, sp^3 (B) sp^3, sp^3 (C) sp^2, sp^2 (D) $\text{sp}^3, \text{sp}^3\text{d}$
- Which starred carbon atom in the following molecules show sp^3 hybridisation :
 (A) $\text{CH}_3 \overset{*}{\text{C}}\text{HO}$ (B) $\text{CH}_3 \overset{*}{\text{C}}\text{OCl}$ (C) $\text{CH}_3\text{CO} \overset{*}{\text{C}}\text{H}_2\text{Cl}$ (D) $\text{CH}_3 \overset{*}{\text{C}}\text{OOCH}_3$
- The hybridisation of P in phosphate ion (PO_4^{3-}) is the same as :
 (A) I in ICl_4^- (B) S in SO_3 (C) N in NO_3^- (D) S in SO_3^{2-}
- The correct order of increasing s character (in percentage) in the hybrid orbitals in below molecules / ions is (assume all hybrid orbitals are exactly equivalent) :
 CO₃²⁻ XeF₄ I₃⁻ NCl₃ BeCl₂(g)
 I II III IV V
 (A) II < III < IV < I < V (B) II < IV < III < V < I (C) III < II < I < V < IV (D) II < IV < III < I < V
- Total number of bonds in $\text{HC} \equiv \text{C} - \text{C} \equiv \text{CH}$?
 (A) 8 (B) 9 (C) 10 (D) 11
- Consider the following statements :
 In $\text{CH}_2 = \overset{\text{I}}{\text{CH}} - \overset{\text{II}}{\text{CH}} - \overset{\text{III}}{\text{C}} \equiv \overset{\text{IV}}{\text{C}} - \text{H}$
 1. There are 6 σ and 3 π bonds.
 2. Carbon I & II are sp^2 hybridised.
 3. Carbon III & IV are sp hybridised.
 The above statements 1, 2, 3 respectively are (T = True, F = False) :
 (A) T T T (B) F T T (C) F T F (D) T F T

11. ✖ XeF₂ molecule is :
 (A) Linear (B) Triangular planar (C) Pyramidal (D) Square planar
12. Which of the following molecules does not have a linear arrangement of atoms ?
 (A) H₂S (B) C₂H₂ (C) BeH₂ (D) CO₂
13. Which of the following species is planar ?
 (A) CO₃²⁻ (B) NH₃ (C) PCl₃ (D) SOCl₂
14. ✖ Which among the following have regular geometry ?
 (A) CCl₄ (B) NF₃ (C) PF₃ (D) SCl₄
15. Hybridisation of central atom of each molecule does not involve "d" orbitals ?
 (A) XeF₄ (B) I₃⁻ (C) CO₂ (D) BrF₅

DPP No. # B9 (JEE-ADVANCED)

Total Marks : 39

Max. Time : 24 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.6

(4 marks, 2 min.)

[24, 12]

Integer type Questions ('-1' negative marking) Q.7 to Q.9

(4 marks 3 min.)

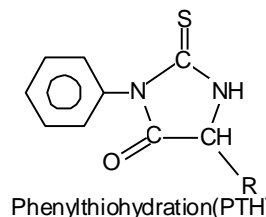
[12, 09]

Match Listing (-1 negative marking) Q.10

(3 marks, 3 min.)

[03, 03]

- 1.* The pair of species having identical shapes for molecules of both species is :
 (A) CF₄, SF₄ (B) XeF₂, CO₂ (C) BF₃, PCl₃ (D) PF₅, IF₃
- 2.* According to VSEPR theory in [IO₂F₂]⁻ ion the F⁺IF bond angle will be nearly
 (A) 120° (B) 90° (C) 109°-28' (D) 180°
- 3.* Which of the following are planar molecule.
 (A) H₂O (B) BF₃ (C) CCl₄ (D) Benzene
- 4.* Which of the following molecules have a linear arrangement of atoms.
 (A) H₂O (B) C₂H₂ (C) BeH₂ (D) CO₂
- 5.* A π -bond may be formed between two p_x orbitals containing one unpaired electron each when they approach each other appropriately along :
 (A) x-axis (B) y-axis (C) z-axis (D) any direction
- 6.* ✖ The odd electron molecules among the following is/are :
 (A) NO₂ (B) NO (C) ClO₂ (D) CO
7. ✖ Is a derivative of amino acid how many number of sp² hybridised carbon atoms in given structure.



8. ✖ In PCl₅ maximum how many atoms are in the same plane.
9. In how many of the following species, bonding is taking place in excited state ?
 BeCl₂(g), CCl₄, NF₃, SO₃²⁻, PCl₅(g), OF₂, BF₃, NOCl, H₂S
10. ✖ Match list I with List II and select the correct answer using the codes given below the lists.

	List I (Compound)		List II (Shape)
(P)	CS ₂	1.	Bent
(Q)	SO ₂	2.	Linear
(R)	BF ₃	3.	Trigonal planer
(S)	NH ₃	4.	Tetrahedral
		5.	Trigonal pyramidal

Codes:

	(P)	(Q)	(R)	(S)		(P)	(Q)	(R)	(S)
(A)	2	1	3	5	(B)	1	2	3	5
(C)	2	1	5	4	(D)	1	2	5	4

DPP No. # B10 (JEE-MAIN)

Total Marks : 45

Max. Time : 30 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.15

(3 marks, 2 min.)

[45, 30]

- Select the correct order of bond angle of the following species.
 $\text{ClO}_3^-, \text{BrO}_3^-, \text{IO}_3^-$
 (A) $\text{BrO}_3^- > \text{IO}_3^- > \text{ClO}_3^-$ (B) $\text{ClO}_3^- > \text{BrO}_3^- > \text{IO}_3^-$ (C) $\text{IO}_3^- > \text{BrO}_3^- > \text{ClO}_3^-$ (D) $\text{IO}_3^- < \text{BrO}_3^- < \text{ClO}_3^-$
- The bond angle in PH_3 would be expected to be close to
 (A) 90° (B) 105° (C) 109° (D) 120°
- Which of the following is the correct reducing order of bond-angle
 (A) $\text{NH}_3 < \text{CH}_4 < \text{C}_2\text{H}_2 < \text{H}_2\text{O}$ (B) $\text{H}_2\text{O} < \text{NH}_3 < \text{CH}_4 < \text{C}_2\text{H}_2$
 (C) $\text{C}_2\text{H}_2 < \text{CH}_4 < \text{H}_2\text{O} < \text{NH}_3$ (D) $\text{NH}_3 < \text{H}_2\text{O} < \text{CH}_4 < \text{C}_2\text{H}_2$
- Maximum bond angle is present in
 (A) BCl_3 (B) BBr_3 (C) BF_3 (D) Same for all
- Which of the following is correct order of HX bond strength :
 (A) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$ (B) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$
 (C) $\text{HF} > \text{HBr} > \text{HCl} > \text{HI}$ (D) $\text{HCl} > \text{HF} > \text{HBr} > \text{HI}$
- Correct order of bond length is
 (A) $\text{SO}_3^{2-} > \text{SO}_4^{2-} > \text{SO}_3$ (B) $\text{SO}_4^{2-} > \text{SO}_3^{2-} > \text{SO}_3$
 (C) $\text{SO}_3 > \text{SO}_3^{2-} > \text{SO}_4^{2-}$ (D) None of these
- The shape of CH_3^+ species is:
 (A) Tetrahedral (B) Square planar (C) Trigonal planar (D) Linear
- In BrF_3 molecule, the lone pairs occupy equatorial positions to minimize
 (A) Lone pair-lone pair repulsion and lone pair-bond pair repulsion
 (B) Lone pair-lone pair repulsion only
 (C) Lone pair-bond pair repulsion only
 (D) Bond pair-bond pair repulsion only
- Given a compound XeO_2F_2 , the hybridisation of Xe and shape of molecule respectively are :
 (A) sp^3d , see-saw (B) sp^3 , tetrahedral (C) sp^3 , see-saw (D) sp^3d , tetrahedral
- VSEPR notation of PCl_5 , H_2O and SF_4 are (Where A is central atom, X is bonded atom and L is lone pair on central atom) :

	PCl_5	H_2O	SF_4		PCl_5	H_2O	SF_4
(A)	AX_5	AX_2L	AX_4L	(B)	AX_5L	AX_2	AX_4L
(C)	AX_5	AX_2L_2	AX_4L	(D)	AX_5L	AX_2L_2	AX_4L_2
- What is the formula of acyclic trisilicate ?
 (A) $\text{Si}_3\text{O}_9^{6-}$ (B) $\text{Si}_3\text{O}_{10}^{8-}$ (C) $\text{Si}_3\text{O}_{11}^{6-}$ (D) $\text{Si}_3\text{O}_9^{8-}$
- Arrange the following compounds in the increasing order of F–Xe–F bond angle : XeF_2 , XeF_4 , XeF_5^-
 (A) $\text{XeF}_2 < \text{XeF}_4 < \text{XeF}_5^-$ (B) $\text{XeF}_5^- < \text{XeF}_4 < \text{XeF}_2$
 (C) $\text{XeF}_2 < \text{XeF}_5^- < \text{XeF}_4$ (D) $\text{XeF}_2 = \text{XeF}_4 = \text{XeF}_5^-$
- In P_4O_{10} molecule
 (A) There are 4 P–P bond (B) There are 8 P–O bond
 (C) The P–O–P bond angle is 180° (D) The phosphorus atom is sp^3 hybridised
- In SO_2 molecule, there are two σ -bonds and two π -bonds. The two π -bonds are formed by :
 (A) $p\pi$ – $p\pi$ overlap between S and O atoms
 (B) sp^2 – p overlap between S and O atoms
 (C) one by $p\pi$ – $p\pi$ overlap and other by $p\pi$ – $d\pi$ overlap
 (D) both by $p\pi$ – $d\pi$ overlap
- Which of the following has the smallest bond angle?
 (A) SF_2 (B) SF_4 (C) SF_6 (D) two of these

DPP No. # B11 (JEE-ADVANCED)

Total Marks : 44

Max. Time : 28 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.5

(4 marks, 2 min.)

[20, 10]

Integer type Questions ('-1' negative marking) Q.6 to Q.9

(4 marks, 3 min.)

[16, 12]

Match the Following (no negative marking) Q.10

(8 marks, 6 min.)

[08, 06]

- 1.* Which of the following orders of bond angle is/are not correct.
 (A) $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3$ (B) $\text{Cl}_2\text{O} > \text{OF}_2 > \text{H}_2\text{O}$
 (C) $\text{CH}_4 > \text{SiH}_4 > \text{GeH}_4$ (D) $\text{XeF}_5^- > \text{XeF}_4 > \text{XeOF}_4$ (F–Xe–F bond)
- 2.* In which of the following species, one of bond angle is expected to be more than 120° .
 (A) Cation of PCl_5 (B) NO_2^- (C) NO_2^+ (D) XeF_3^+
- 3.* Which of the following is/are electron deficient compounds ?
 (A) NaBH_4 (B) B_2H_6 (C) AlCl_3 (D) LiAlH_4
- 4.* Which of the following statements are incorrect ?
 (A) In $\text{B}_2\text{H}_6(\text{g})$ there are four 2-center-2-electron bonds
 (B) In $(\text{SiH}_3)_3\ddot{\text{P}}$ there is significant back bonding
 (C) $(\text{CH}_3)_3\ddot{\text{N}}$ and $(\text{SiH}_3)_3\ddot{\text{N}}$ are pyramidal
 (D) $\text{Al}_2\text{Cl}_6(\text{g})$ has 3-center-2-electron bonds
- 5.* Which of the following order is/are correct :
 (A) $\text{O}_2^+ < \text{O}_2 < \text{O}_2^-$ (Bond energy) (B) $\text{BF}_3 = \text{BCl}_3 = \text{BBr}_3$ (Bond angle)
 (C) $\text{N-H} < \text{P-H} < \text{As-H} < \text{Sb-H}$ (Bond length) (D) None of these
6. Number of shortest P–O bonds present in triphosphate ion $\text{P}_3\text{O}_{10}^{5-}$ is.
7. BrF_3 is a liquid which considerably undergoes self ionization to form cationic and anionic species. Based on VSEPR theory, number of 90 degree F–Br–F bond angles is in anionic species.
 $2\text{BrF}_3 \rightleftharpoons [\text{BrF}_2]^+ + [\text{BrF}_4]^-$
8. How many of the following species have all bonds of equal length ?
 (a) ClO_4^- (b) NO_3^- (c) AsO_4^{3-} (d) CO_2 (e) SO_3^{2-}
9. How many of the following are planar ?
 XeF_2 , ClF_3 , H_2O , $[\text{XeF}_5]^-$, I_3^- , BCl_3 , XeF_4 , SF_4 , PCl_5 , SF_6 , IF_7 .
- 10.* Match the species in column (I) with their characteristics in column (II) :

Column-I (Compound)	Column-II (Bond angle)
(A) CBr_4	(p) More than $109^\circ 28'$
(B) OCl_2	(q) Less than $109^\circ 28'$
(C) OF_2	(r) Equal to $109^\circ 28'$
(D) BBR_3	(s) Equal to 120°

DPP No. # B12 (JEE-MAIN)

Total Marks : 54

Max. Time : 36 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.18

(3 marks, 2 min.)

[54, 36]

1. Which one of the following species is diamagnetic in nature?
 (A) H_2 (B) He_2^+ (C) H_2^- (D) H_2^+
2. How many nodal plane is/are present in σ_{1s} bonding molecular orbital ?
 (A) zero (B) 1 (C) 2 (D) 3
3. Which of the following statements is not correct regarding bonding molecular orbitals?
 (A) Bonding molecular orbitals possess less energy than the atomic orbitals from which they are formed
 (B) Bonding molecular orbitals have low electron density between the two nuclei
 (C) Every electron in bonding molecular orbitals contributes to the attraction between atoms
 (D) They are formed when the lobes of the combining atomic orbitals have the same sign

4. According to molecular orbital theory which of the following is correct :
 (A) LUMO level for C_2 molecule is a σ_{2p} orbital (B) In C_2 molecule both the bonds are π bonds
 (C) In C_2^{2-} ion there is one σ and two π bonds (D) all the above are correct.
5. Which of the following MO has lowest energy for B_2 molecule ?
 (A) σ_{2p_x} (B) $\sigma^*_{2p_x}$ (C) π_{2p_y} (D) $\pi^*_{2p_y}$
6. **S₁** : AntiBonding M.O. are formed by the linear combination of two atomic orbitals when their wave functions are added.
S₂ : The electron density increases between the nuclei for Bonding M.O.
S₃ : AntiBonding M.O. has no nodal plane
S₄ : The energy of Bonding M.O. is always more than energies of the combining atomic orbitals
 (A) TFFT (B) FTFT (C) FTFF (D) FFFT
7. Which of the following statements is not correct from the point of view of molecular orbital theory :
 (A) Be_2 is not a stable molecule.
 (B) He_2 is not stable, but He_2^+ is expected to exist.
 (C) Bond strength of N_2 is maximum amongst the homonuclear diatomic molecules.
 (D) The order of energies of molecular orbitals in F_2 molecule is :
 $E(\sigma_{2s}) < E(\sigma^*_{2s}) < E(\pi_{2p_x}) = E(\pi_{2p_y}) < E(\sigma_{2p_z}) < E(\pi^*_{2p_x}) = E(\pi^*_{2p_y}) < E(\sigma^*_{2p_z})$
8. On the basis of MOT which is **correct** :
 (A) The bond order for C_2 molecule is two and both bonds are σ -bonds
 (B) The LUMO in C_2 molecule is σ_{2p} bonding molecular orbital
 (C) The HOMO in C_2 molecule are π type of antibonding molecular orbital containing total 4 electrons
 (D) None of the above is correct
9. Which of the following pairs of species would you expect to have largest difference in spin magnetic moment:
 (A) O_2 , O_2^+ (B) O_2 , O_2^{2-} (C) O_2^+ , O_2^{2-} (D) O_2^- , O_2^+
10. The following graph is given between total energy and distance between the two nuclei for species H_2^+ , H_2 , He_2^+ & He_2 . Which of the following statements is correct :
-
- (A) He_2^+ is more stable than H_2^+ .
 (B) Bond dissociation energy of H_2^+ is more than bond dissociation energy of He_2^+ .
 (C) Since bond orders of He_2^+ and H_2^+ are equal, hence both will have equal bond dissociation energy.
 (D) Bond length of H_2^+ is less than bond length of H_2 .
11. Which of the following has 1.5 bond order :
 (A) CN^- (B) O_2^- (C) NO^+ (D) CN^{\oplus}
12. Bond order in N_2^+ ion is :
 (A) 1 (B) 2 (C) 2.5 (D) 3

13. The main axis of diatomic molecule is z axis. The orbital p_x and p_x overlap to form :
 (A) π molecular orbital (B) σ molecular orbital
 (C) δ molecular orbital (D) No bond will be formed
14. Paramagnetism is observed in :
 (A) N_2 (B) O_2 (C) He (D) O_2^{2-}
15. Which of the following forms only π -bond using Molecular orbital theory :
 (A) Li_2 (B) C_2 (C) N_2 (D) O_2
16. According to Molecular orbital theory, HOMO in O_2^- is :
 (A) $\pi 2p_x = \pi 2p_y$ (B) $\pi^* 2p_x = \pi^* 2p_y$ (C) $\sigma 2p_z$ (D) $\sigma^* 2p_z$
17. Order of stability of N_2 , N_2^+ and N_2^- is :
 (A) $N_2 > N_2^+ > N_2^-$ (B) $N_2^+ > N_2 > N_2^-$ (C) $N_2^- > N_2 > N_2^+$ (D) $N_2^- = N_2^+ > N_2$
18. The bond order in NO is 2.5 while that in NO^+ is 3. Which of the following statements is true for these two species :
 (A) Bond length in NO^+ is same as that in F_2 . (B) Bond length in NO is greater than in NO^+ .
 (C) Bond length in NO^+ is equal to that in NO. (D) Bond length in NO^+ is lesser than in NO.

DPP No. # B13 (JEE-MAIN)

Total Marks : 60

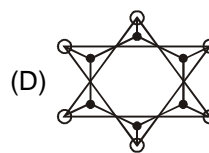
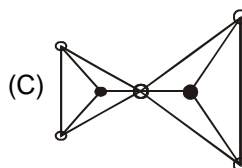
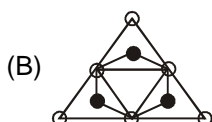
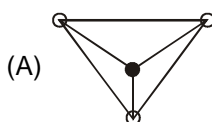
Max. Time : 40 min.

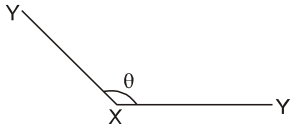
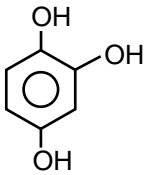
Single choice Objective ('-1' negative marking) Q.1 to Q.20

(3 marks, 2 min.)

[60, 40]

1. In which of the following central atom is hybridised.
 (A) H_2S (B) H_2O (C) PH_3 (D) AsH_3
2. In the trimer of SO_3 , How many $d\pi-p\pi$ bonds are present.
 (A) 2 (B) 4 (C) 6 (D) None of these
3. White phosphorus has :
 (A) six P-P single bonds (B) four lone pairs of electrons
 (C) PPP angle of 60° (D) all of these
4. In P_4S_3 how many P-P bonds are present.
 (A) 3 (B) 4 (C) 5 (D) 2
5. ✖ Diamond is a hard substance because :
 (A) it has ionic bond.
 (B) it has planar arrangement of carbon atoms.
 (C) it has sp^3 hybridized carbon atoms which are arranged tetrahedrally in a cross-network structure.
 (D) it has sp^2 hybridized carbon atoms arranged in a planar geometry.
6. ✖ Graphite is a good conductor of heat and electricity, while diamond is not because :
 (A) graphite has ionic bonds and diamond has covalent bonds.
 (B) graphite has covalent bonds and diamond has ionic bonds.
 (C) graphite has delocalized electrons whereas diamond has not.
 (D) graphite has sp^3 hybridized carbon atoms and diamond has sp^2 hybridized carbon atoms.
7. Most recently developed carbon allotrope 'C-60' Buckminster Fullerene has shape of :
 (A) football (B) thin sheet of steel (C) diamond (D) none of these
8. Two types of carbon-carbon covalent bond lengths are present in :
 (A) diamond (B) graphite (C) C_{60} (D) benzene
9. ✖ Which of the following represents a pyrosilicate structure :
 ○ — Oxygen ● — Silicon



10. Which is the hybridization of the central atom of SiO_2 :
 (A) sp (B) sp^2 (C) sp^3 (D) sp^3d
11. Hydrogen forms bridge in the chemical structure of :
 (A) Hydrogen peroxide (B) Lithium hydride
 (C) Diborane (D) Sodium peroxide
12. In B_2H_6 :
 (A) There is a direct boron-boron bond.
 (B) The structure is similar to that of C_2H_6 .
 (C) The boron atoms are linked through hydrogen bridges.
 (D) All the atoms are in one plane.
13. Which is not true about B_2H_6
 (A) Both 'B' atoms are sp^3 hybridised
 (B) Boron atom is in ground state
 (C) Two hydrogens occupy special positions
 (D) There are two, three centre two electron bonds
14. For BF_3 molecule which of the following is true ?
 (A) B-atom is sp^2 hybridised.
 (B) There is a $P\pi-P\pi$ back bonding in this molecule.
 (C) Observed B-F bond length is found to be less than the expected bond length.
 (D) All of these
15. Respective order of strength of back-bonding and Lewis acidic strength in boron trihalides is :
 (A) $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$ and $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$
 (B) $\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3$ and $\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3$
 (C) $\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3$ and $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$
 (D) $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$ and $\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3$
16. The correct order of increasing covalent character is :
 (A) LiCl , NaCl , BeCl_2 (B) BeCl_2 , NaCl , LiCl
 (C) NaCl , LiCl , BeCl_2 (D) BeCl_2 , LiCl , NaCl
17. When two ice cubes are pressed over each other, they unite to form one cube. Which of the following force is responsible for holding them together :
 (A) Vander Waal's forces (B) Hydrogen bond
 (C) Covalent attraction (D) Dipole-dipole attraction.
18. Which bond angle θ would result in maximum dipole moment for the triatomic molecule XY_2 shown below :

 (A) $\theta = 90^\circ$ (B) $\theta = 120^\circ$ (C) $\theta = 150^\circ$ (D) $\theta = 180^\circ$
19. The type of molecular force of attraction present in the following compound is :

 (A) Intermolecular H-bonding (B) Intramolecular H-bonding
 (C) Both (A) and (B) (D) None of these
20. Which among the following has the maximum value of dipole moment ?
 (A) SO_3 (B) NF_3 (C) NH_3 (D) $\text{N}(\text{SiH}_3)_3$

DPP No. # B14 (JEE ADVANCED)

Total Marks : 56

Max. Time : 34 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.8

(4 marks, 2 min.)

[32, 16]

Integer type Questions ('-1' negative marking) Q.9 to Q.12

(4 marks 3 min.)

[16, 12]

Match the Following (no negative marking) Q.12

(8 marks, 6 min.)

[08, 06]

- 1.* The odd electron molecule(s) among the following is/are :
(A) NO_2 (B) NO (C) ClO_2 (D) CO
- 2.* Which of the following is/are nonplanar molecule/s :
(A) XeF_4 (B) NH_3 (C) CH_3^- (D) C_6F_6
- 3.* Which of the following orders is correct in respect of bond dissociation energy ?
(A) $\text{N}_2^+ > \text{N}_2^-$ (B) $\text{O}_2^+ > \text{O}_3$ (C) $\text{NO}^+ > \text{NO}$ (D) $\text{C}_2 > \text{C}_2^+$
- 4.* Which of the following is(are) electron-deficient compounds ?
(A) AlCl_3 (B) BeH_2 (C) B_2H_6 (D) LiAlH_4
- 5.* CO_3^{2-} anion have which of the following characteristics :
(A) Bonds of unequal length (B) sp^2 hybridisation of C atom
(C) Resonance stabilization (D) Same bond angles.
- 6.* Among the following molecules
(i) XeO_3 (ii) XeOF_4 (iii) XeO_2F_2 (iv) XeF_6
those having different molecular geometry(SHAPE) but same number of lone pairs on Xe are.
(A) (i) (B) (ii) (C) (iii) (D) (iv)
- 7.* According to molecular orbital theory which of the following(s) is/are correct :
(A) LUMO level for C_2 molecule is a $\sigma 2p$ orbital
(B) In C_2 molecule both the bonds are π bonds
(C) In C_2^{2-} ion there is one σ and two π bonds
(D) all the above are incorrect.
- 8.* Which of the following orders is/are correct in respect of bond dissociation energy ?
(A) $\text{N}_2^+ > \text{N}_2^-$ (B) $\text{O}_2^+ > \text{O}_3$ (C) $\text{NO}^+ > \text{NO}$ (D) $\text{C}_2 > \text{C}_2^+$
9. In cyclic trimer of SO_3 (i.e. S_3O_9) the number of oxygen atoms bonded to each sulphur atom is :
10. How many of the following are planar ?
 XeF_2 , ClF_3 , H_2O , $[\text{XeF}_5]^-$, I_3^- , BCl_3 , XeF_4 , SF_4 , PCl_5 , SF_6 , IF_7 .
11. How many among the following species contain P-P bond(s) :
(i) P (red) (ii) $\text{H}_4\text{P}_2\text{O}_5$ (iii) $\text{H}_4\text{P}_2\text{O}_7$ (iv) $(\text{PO}_3^-)_3$ (v) $(\text{PO}_3^-)_2$
(vi) P_4O_{10} (vii) P_4S_3 (viii) P_4O_6 (ix) P_4
12. How many of these species are paramagnetic ?
 O_2 , O_2^+ , O_2^- , O_2^{2-} , C_2 , B_2 , Be_2 , Li_2
13. Match the following :

	List-I		List-II
(A)	BF_3	(p)	sp hybridization
(B)	$(\text{SiH}_3)_3\text{N}$	(q)	$p\pi - p\pi$ back bond
(C)	B_2H_6	(r)	$p\pi - d\pi$ back bond
(D)	N_3^-	(s)	$3c - 2e$ bond