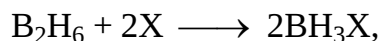


EXERCISE-1

[SINGLE CORRECT CHOICE TYPE]

Boron Family

Q.1 In the following reaction, compound (X) is



(A) NH_3

(B) R_3N

(C) RNH_2

(D) R_2NH

Q.2 Incorrect statement for compound TlI_3 , is :

(A) Oxidation state of Tl is +1.

(B) Hybridization of central iodine atom is sp^3d .

(C) All iodine atoms are not neutral.

(D) Ionic interactions exists between Tl^{3+} and I^- ions.

Q.3 Which statement regarding benzene and borazine is **incorrect** ?

(A) Both are isostructural and isoelectronic

(B) Both have same no. of sp^2 hybridised atoms

(C) Reactivity of both towards HCl is same

(D) Both have 12σ and 3π bonds in them

Q.4 Which statement is **correct** regarding the diagonal relationship between Be and Al?

(I) Both carbides on hydrolysis produces CH_4 gas

(II) Both Be and Al oxides are amphoteric in nature.

(III) In vapour state chlorides of both exist as chloro-bridge dimer having $(3c - 4e)$ bonds

(IV) Both Be and Al nitrides on hydrolysis give NH_3 gas.

(A) I, II are correct

(B) I, III are correct

(C) I, II, III, IV are correct

(D) Only III is correct

Q.5 Borax on heating strongly above its melting point melts to a liquid, which then solidifies to a transparent mass commonly known as borax bead. The transparent glassy mass consists of

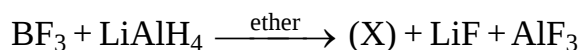
(A) Sodium pyroborate

(B) Boric anhydride

(C) Sodium metaborate

(D) Mixture of sodium metaborate and boric anhydride

Q.6 The incorrect statement regarding 'X' in given reaction is :



- (A) 'X' is a toxic gas
- (B) On hydrolysis 'X' produces boric acid
- (C) 'X' is electron deficient and behaves as lewis acid
- (D) Structure of 'X' is similar to C_2H_6

Q.7 Select correct statement:

- (A) $\angle \text{F} - \text{N} - \text{F}$ in $\text{NF}_3 > \angle \text{Cl} - \text{N} - \text{Cl}$ in NCl_3
- (B) $\text{AlCl}_3 \cdot 6\text{H}_2\text{O}$ is an electron deficient compound
- (C) Order of stability: $\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3$
- (D) B – O bond strength: $\text{B}(\text{OH})_3 > \text{B}(\text{OH})_2\text{Me}$

Q.8 Which of the following molecular species does not act as Lewis acid.

- (A) B_2H_6 (B) BeF_2 (C) AlCl_3 (D) BF_4^-

Q.9 For reaction $\text{BF}_3 + \text{NaH} \xrightarrow{450 \text{ K}} \text{P} + \text{Q}$

If Q is sodium salt, then **incorrect** statement is :

- (A) P is an electron deficient compound
- (B) P forms adduct with PH_3
- (C) Acidified MnO_2 oxidizes Q into a coloured gas
- (D) Q forms white precipitate with CaCl_2 solution

Q.10 Which of the following statements regarding boric acid (H_3BO_3) is false?

- (A) It acts as weak monobasic Lewis Acid
- (B) All atoms are lying in same plane
- (C) It contains H-bonding in solid state
- (D) It acts as tribasic acid

Q.11 When borax is dissolved in water

- (A) Only $\text{B}(\text{OH})_3$ is formed
- (B) Only $\text{B}(\text{OH})_4^-$ is formed
- (C) Both $\text{B}(\text{OH})_3$ and B_2O_3 are formed
- (D) Both $\text{B}(\text{OH})_3$ and $[\text{B}(\text{OH})_4]^-$ are formed

Q.12 Which statement is correct?

- (A) Tl^{3+} salts act as good oxidising agents
- (B) In borax bead test the coloured ions give characteristic coloured bead due to formation of metal phosphates
- (C) BCl_3 and AlCl_3 both are Lewis acids but AlCl_3 is stronger Lewis acid than BCl_3
- (D) Boric acid is a protonic acid

- Q.13 Select **incorrect** statement for Al
- (A) Conc. HNO_3 can be stored in aluminium container
 - (B) Aluminium wire is used to make transmission cables
 - (C) Mixture of Al & NaOH is used to open drain
 - (D) Aluminium utensils are used to kept water over night
- Q.14 Anhydrous AlCl_3 is covalent however when it is dissolved in water hydrated ionic species are formed. This transformation is owing to :
- (A) The trivalent state of Al.
 - (B) The large hydration energy of Al^{3+}
 - (C) The low hydration energy of Al^{3+}
 - (D) The Polar nature of water
- Q.15 $\text{H}_3\text{BO}_3 \xrightarrow{\text{T}_1} \text{X} \xrightarrow{\text{T}_2} \text{Y} \xrightarrow{\text{red hot}} \text{B}_2\text{O}_3$, if $\text{T}_1 < \text{T}_2$ then X and Y respectively are
- (A) X = Metaboric acid and Y = Tetraboric acid
 - (B) X = Tetraboric acid and Y = Metaboric acid
 - (C) X = Borax and Y = Metaboric acid
 - (D) X = Tetraboric acid and Y = Borax
- Q.16 Borax is actually made of two tetrahedra and two triangular units joined together and should be written as:
- $$\text{Na}_2[\text{B}_4\text{O}_5(\text{OH})_4] \cdot 8\text{H}_2\text{O}$$
- Consider the following statements about borax :
- a. Each boron atom has four B–O bonds
 - b. Each boron atom has three B–O bonds
 - c. Two boron atoms have four B–O bonds while other two have three B–O bonds
 - d. Each boron atom has one –OH groups
- Select correct statement(s):
- (A) a, b
 - (B) b, c
 - (C) c, d
 - (D) a, c
- Q.17 Select correct statement about B_2H_6
- (A) Bridging groups are electron-deficient with 12 valence electrons
 - (B) It has 2c - 2e B–H bonds
 - (C) It has 3c - 2e B–H–B bonds
 - (D) All of above are correct statements

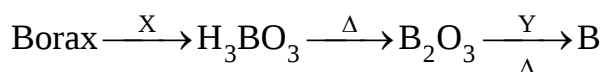
- Q.18 Aluminium vessels should not be washed with materials containing washing soda because -
 (A) Washing soda is expensive
 (B) Washing soda is easily decomposed
 (C) Washing soda reacts with aluminium to form soluble aluminate
 (D) Washing soda reacts with aluminium to form insoluble aluminium oxide.

- Q.19 (a) $\text{Al} \xrightarrow{\text{N}_2} \text{A}$, (b) $\text{Al} \xrightarrow{\text{C}} \text{B}$, Product A and B on hydrolysis yields respectively.
 (A) Ammonia and acetylene (B) Ammonia and methane
 (C) Nitric oxide and acetylene (D) None

- Q.20 $n \text{ mole of Boron ic acid} \xrightarrow{-n\text{H}_2\text{O}} \text{'X' (Acid)}_n \xrightarrow{\text{if } n=4} \text{'Y' Compound} \xrightarrow[1 \text{ mole } -\text{H}_2\text{O}]{\text{Compound}} \text{'Z' Compound} \xrightarrow[+2\text{Na}]{-2\text{H}^+} \text{Salt of Compound 'Z'} \xrightarrow{10\text{H}_2\text{O}} \text{'P' Compound}$
 (It is used as a Antiseptic in medicinal soap's preparation)

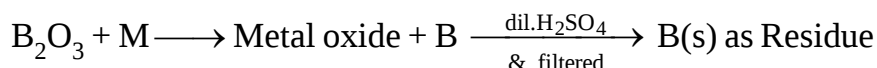
Choose the **incorrect** option regarding above paragraph.

- (A) In both compound 'Y' and 'P' Boron has same hybridisation.
 (B) In both compound 'Y' and 'P' B–O–B linkage is in Bent form
 (C) Compound 'P' has more B–O–B linkage as compare to compound 'Y'.
 (D) In compound 'P' two Boron are in triangular form and two Boron are in tetrahedral form but in compound 'Y' all Boron are in triangular form.
- Q.21 Borax is converted into amorphous Boron by following steps



X and Y are respectively

- (A) HCl, Mg (B) HCl, C (C) Δ , Al (D) HCl, Al
- Q.22 The isolation of 'B' from B_2O_3 can be done by the following steps.



Which of the following metal is not suitable for the above process.

- (A) Na (B) K (C) Ca (D) Mg
- Q.23 Boron dissolves in (under suitable condition)
 (A) HBr (B) H_2CO_3 (C) conc. H_2SO_4 (D) H_3PO_4

Q.24 Which of the following undergoes partial hydrolysis?

- (A) B_2H_6 (B) BCl_3 (C) H_2SO_4 (D) BF_3

Q.25 Which of the following exists as polymeric (covalent) solid at room temperature with coordination number '6' for the central atom?

- (A) AlF_3 (B) $AlCl_3$ (C) $AlBr_3$ (D) AlI_3

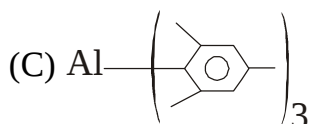
Q.26 $B_2H_6 + NaH \longrightarrow ?$

The correct statement(s) is / are

- (A) Symmetrical cleavage takes place (B) $NaBH_4$ is produced
(C) H_2 is produced (D) Both (A) and (B)

Q.27 Which of the following has the least tendency to dimerise?

- (A) $Al(CH_3)_3$ (B) $AlBr_3$



- (D) $GaCl_3$

Q.28 $B_3N_3H_6$ upon hydrolysis yields

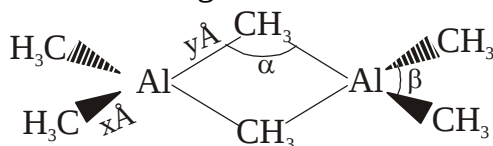
- (A) H_3BO_3 (B) NH_3 (C) H_2 (D) All of these

Q.29 In $B_3N_3H_6$ compound, the **correct** option is (State 'T' for **True** and 'F' for **False**):

- (I) '3' $p\pi-p\pi$ bond is present
(II) It can show back bonding.
(III) It is non-polar compound with non polar bonds.
(IV) Lumpy nodes are present at Boron atom.

- (A) TTFF (B) TTTT (C) TTTF (D) FTTF

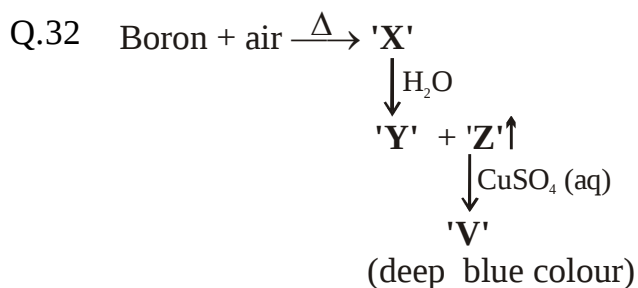
Q.30 Consider the structure given below :



Select the **correct** option(s):

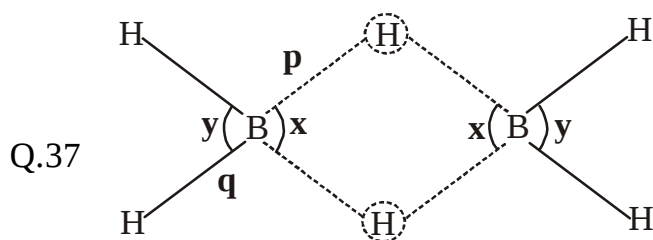
- (A) $x < y$
(B) $\alpha < \beta$
(C) Bridge bond is formed by $sp^3 - sp^3 - sp^3$ overlap
(D) All of these

- Q.31 Boric acid is an acid because :
- (A) It contains replaceable H^+ ion
(B) It gives up a proton
(C) It accepts OH^- from water releasing H^+
(D) It combines with proton to form water molecule



The hybridisation of compound 'V' is :

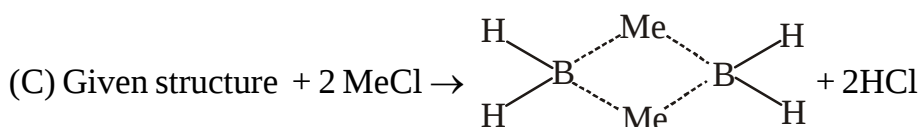
- (A) dsp^2 (B) sp^3 (C) d^2sp^3 (D) sp^2
- Q.33 Find the ratio of sp^2 and sp^3 hybridised atom in $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$.
(A) 2 : 19 (B) 2 : 2 (C) 2 : 11 (D) 1 : 19
- Q.34 Number of π bonds in borax is
(A) Zero (B) One (C) Two (D) Three
- Q.35 $\text{Mg}_3\text{B}_2 + \text{HCl} \longrightarrow [\text{P}] + \text{MgCl}_2$
then choose incorrect statement.
(A) [P] is electron deficient (B) [P] is non polar
(C) One of the atom in [P] is sp^3 hybridised (D) [P] is planar
- Q.36 The total number of oxo linkage ($\text{X}-\text{O}-\text{X}$) in Borax molecule is :
(A) 3 (B) 4 (C) 5 (D) 6



Select the **incorrect** option regarding above structure.

(A) $p > q$

(B) $y > x$



(D) Bond strength of $B \cdots (\text{H}) \cdots B > B - H$

Q.38 B_2H_6 is symmetrically cleaved by:

(A) NH_3

(B) CH_3NH_2

(C) $(CH_3)_2NH$

(D) None of these

Q.39 One of the hydrolysed product of the following compound does not react with silica of glass vessel

(A) BF_3

(B) ClF_5

(C) XeF_2

(D) SF_4

Carbon Family

Q.40 An inorganic compound (A) made of two most occurring elements into the earth crust, having a polymeric tetra-headral network structure. With carbon, compound (A) produces a poisonous gas (B) which is the most stable diatomic molecule. Compounds (A) and (B) will be

(A) SiO_2 , CO_2

(B) SiO_2 , CO

(C) SiC , CO

(D) SiO_2 , N_2

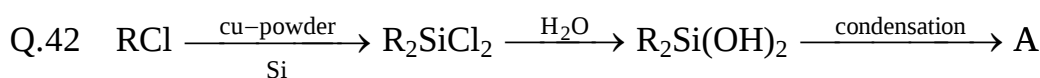
Q.41 The incorrect statement is :

(A) $SnCl_4$ is more covalent than $SnCl_2$

(B) PbI_4 commonly does to exist

(C) GeX_4 is more stable than GeX_2

(D*) PbX_4 is more stable than PbX_2



Compound (A) is

(A) a linear silicone

(B) a chlorosilane

(C) a linear silane

(D) a network silane

- Q.43 Which of the following organo silicon chloride can produce cross linked 3D silicone polymer .
(A) R_3SiCl (B) R_4Si (C) $RSiCl_3$ (D) R_2SiCl_2
- Q.44 Graphite is soft while diamond is hard because
(A) Graphite is in powder form
(B) Graphite have sp^2 while diamond has sp Hybridized 'C' atom
(C) Graphite is planar layered solid while diamond is 3-D giant network solid
(D) Graphite is covalent while diamond is ionic
- Q.45 SnO is prepared in pure form by thermal decomposition of
(A) $Sn(NO_3)_2$ (B) $SnSO_4$ (C) SnC_2O_4 (D) All
- Q.46 Correct order of melting point is
(A) Diamond > Graphite > C_{60} (B) Graphite > Diamond > C_{60}
(C) C_{60} > Graphite > Diamond (D) Diamond > C_{60} > Graphite
- Q.47 PbI_4 does not exist because
(A) Iodine is not reactive (B) $Pb(IV)$ is oxidising and I^- is a strong reducing agent
(C) $Pb(IV)$ is less stable than $Pb(II)$ (D) Pb^{4+} is not easily formed
- Q.48 Plague of tin is
(A) Conversion of white tin to grey tin (B) Emission of sound while bending a tin rod
(C) Conversion of stannous to stannic form (D) Atmospheric oxidation of tin
- Q.49 Which metal bicarbonates do not exist in Solid state?
(i) $LiHCO_3$ (ii) $Ca(HCO_3)_2$ (iii) $Zn(HCO_3)_2$ (iv) $AgHCO_3$
(A) (i), (ii), (iii), (iv) (B) (i), (ii), (iii) (C) (i), (ii), (iv) (D) (ii), (iii), (iv)
- Q.50 Oxalic acid reacts with concentrated H_2SO_4 to give a mixture of two gases. When this mixture is passed through caustic potash, one of the gases is absorbed. Which is the product formed by the absorbed gas with caustic potash ?
(A) K_2SO_4 (B) $KHCO_3$ (C) K_2CO_3 (D) KOH
- Q.51 Which is incorrect order for group 14 elements?
(A) $CX_2 < SiX_2 < GeX_2 < SnX_2$: Order of stability
(B) $CO_2 > SiO_2 > GeO_2$: Order of acidic character
(C) $C > Si > Ge \approx Sn > Pb$: Tendency for catenation
(D) $C > Si > Ge > Sn > Pb$: Order of I.E

- Q.52 Which of the following statements are correct?
(I) SnCl_4 is more easily hydrolysed than SnCl_2 (II) SnCl_2 is good reductant while PbCl_4 is oxidant
(III) SnCl_4 is more volatile than SnCl_2 (IV) PbI_4 do not exist
(A) I, II, IV (B) II, IV (C) I, II, III, IV (D) Only IV
- Q.53 If ΔH_f° of graphite is taken as zero then ΔH_f° of diamond and fullerene is respectively in kJ/mole
(A) 1.90, 38.1 (B) 1.90, -38.1 (C) -1.90, 38.1 (D) -1.90, -38.1
- Q.54 Which of the following silicate is identified by general formula $(\text{Si}_2\text{O}_5)_n^{2n-}$
(A) Cyclic silicate (B) Pyro silicate (C) Amphiboles (D) Sheet silicates
- Q.55 Which of the following metal carbides is a methanide carbide?
(A) CaC_2 (B) Mg_2C_3 (C) Al_4C_3 (D) BaC_2
- Q.56 Which of the following carbides yields carbon containing compound having sp hybridisation on hydrolysis.
(A) Be_2C (B) Al_4C_3 (C) Mg_2C_3 (D) None of these
- Q.57 An aqueous solution of SnCl_2 does not reduce which of the following metal cation into its respective metallic form.
(A) $\text{Bi}^{3+}(\text{aq})$ (B) $\text{Hg}^{2+}(\text{aq})$ (C) $\text{Au}^{3+}(\text{aq})$ (D) $\text{Fe}^{3+}(\text{aq})$
- Q.58 $(\text{COOH})_2 \xrightarrow{\text{conc. H}_2\text{SO}_4} \text{P} + \text{Q} + \text{H}_2\text{O}$
P can be estimated by using I_2O_5 then incorrect statement about Q is
(A) Q reacts with NH_3 to form urea
(B) Q is linear and neutral oxide
(C) Gives white turbidity with $\text{Ba}(\text{OH})_2$ solution
(D) In solid form Q is a sublimate compound
- Q.59 Suppose you have to determine the percentage of carbon dioxide in a sample of a gas available in a container. Which is the best absorbed material for the carbon dioxide :
(A) Heated copper oxide (B) Cold, solid calcium chloride
(C) Cold, solid calcium hydroxide (D) Heated charcoal
- Q.60 Bucky ball or buck minister fullerene is :
(A) An allotrope of carbon
(B) It is referred as C-60
(C) It has sp^2 -hybridised nature and resembles with soccer ball
(D) all of these

- Q.61 When CO is heated with NaOH under pressure, we get :
(A) Sodium benzoate (B) Sodium acetate (C) Sodium formate (D) Sodium oxalate
- Q.62 Artificial gem used for cutting glass is :
(A) Graphite (B) Diamond (C) SiC (D) CaCN_2
- Q.63 Which of the following properties describes the diagonal relationship between boron and silicon?
(A) BCl_3 is not hydrolysed while SiCl_4 can be hydrolysed
(B) Both form oxides; B_2O_3 is amphoteric; SiO_2 is acidic
(C) Both metals dissolve in cold and dilute nitric acid
(D) Borides and silicides are hydrolysed by water
- Q.64 The silicate anion in the mineral kinoite is a chain of three SiO_4 tetrahedral, that share corners with adjacent tetrahedral. The charge of the silicate anion is
(A) -4 (B) -8 (C) -6 (D) -2
- Q.65 $\text{H}_2\text{C}_2\text{O}_4 \xrightarrow{\Delta} \text{gas (A)} + \text{gas(B)} + \text{liquid (C)}$. Gas (A) burns with a blue flame and is oxidised to gas (B).
$$\text{Gas (A)} + \text{Cl}_2 \longrightarrow \text{D} \xrightarrow{\text{NH}_3, \Delta} \text{E}$$

A, B, C and E are
(A) CO_2 , CO, H_2O , HCONH_2 (B) CO, CO_2 , COCl_2 , HCONH_2
(C) CO, CO_2 , H_2O , NH_2CONH_2 (D) CO, CO_2 , H_2O , COCl_2
- Q.66 The correct order of ionization enthalpy is :
(A) $\text{C} > \text{Si} > \text{Ge} > \text{Sn} > \text{Pb}$ (B) $\text{C} > \text{Ge} > \text{Si} > \text{Pb} > \text{Sn}$
(C) $\text{C} > \text{Ge} > \text{Si} > \text{Pb} > \text{Sn}$ (D) $\text{C} > \text{Si} > \text{Ge} > \text{Pb} > \text{Sn}$
- Q.67 The incorrect statement regarding carbon dioxide
(A) Solid CO_2 is known as Dry ice.
(B) It is responsible for Green house effect
(C) Solid CO_2 has high mp than solid PbO_2
(D) It contains two sigma and two $\text{p}\pi\text{-p}\pi$ bonds

Q.68 Match **List-I** with **List-II** and select the correct answer using the codes given below the lists.

List-I (Compound)				List-II			
(a)	B_4C	(1)					
(b)	Al_4C_3	(2)					
(c)	Mg_2C_3	(3)					
(d)	WC	(4)					
	(a)	(b)	(c)	(d)		(a)	(b)
(A)	4	3	1	2	(B)	3	4
(C)	2	3	1	4	(D)	4	3

Q.69 Correct order of bond angle in CH_2F_2

- (A) $\angle HCH > \angle HCF > \angle FCF$ (B) $\angle FCF > \angle HCF > \angle HCH$
 (C) $\angle HCH > \angle FCF > \angle HCF$ (D) $\angle HCF > \angle FCF > \angle HCH$

Q.70 In which of the following silicates, only two corners per tetrahedron are shared :

- (i) Pyrosilicate (ii) Cyclic silicate
 (iii) Double chain silicate (iv) Single chain silicate
 (v) 3 D silicate (vi) Sheet silicate
 (A) (i), (ii) and (v) (B) (iv) and (vi) only (C) (i) and (vi) only (D) (ii) and (iv) only

Q.71 The number of σ -bond and π -bond in HCP are respectively

- (A) 2 and 2 (B) 1 and 3 (C) 2 and 1 (D) None

Q.72 Amphibole silicate structure has 'x' number of corner shared per tetrahedron. The value of 'x' is:

- (A) 2 (B) $2\frac{1}{2}$ (C) 3 (D) 4

Q.73 Number of corner oxygen atoms shared per tetrahedron in pyroxene and sheet silicate

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

Q.74 Ammonolysis of $SiCl_4$ followed by heating produces a compound of Silicon (X). X is

- (A) Covalent nitride (B) Ionic nitride
 (C) Interstitial nitride (D) it is not a nitride

Q.75 In which of the following options CO is not the constituent.

- (A) Carbogen (B) Water gas (C) Producer gas (D) None of these

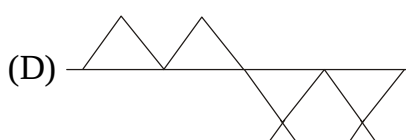
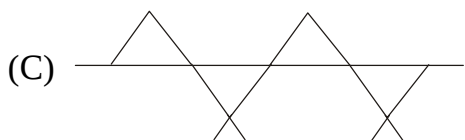
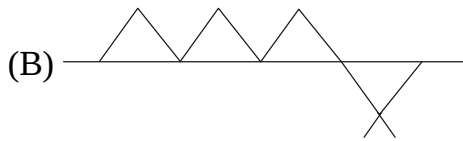
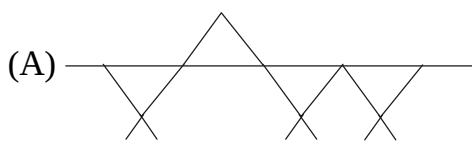
Q.76 Select the correct statement(s) regarding $\text{Sc}_2\text{Si}_2\text{O}_7$?

- (A) It is an example of orthosilicate
- (B) Anion is made of two tetrahedra units, sharing one corner.
- (C) It has cyclic structure
- (D) All of these

Q.77 Which of the following is most acidic?

- (A) PbO_2
- (B) SiO_2
- (C) SnO_2
- (D) SnO

Q.78 Which of following is true presentation of unit of silicate $9/4$ oxygen shared per tetrahedra in double chain silicate?



Q.79 $\text{HOOC} - \text{CH}_2 - \text{COOH} \xrightarrow{\text{P}_4\text{O}_{10}} ?$

The number of sp - hybridised 'C' in one molecule of the product is :

- (A) 1
- (B) 2
- (C) 3
- (D) zero

Q.80 Silicon has a strong tendency to form polymers like silicones. The chain length of silicone polymers can be controlled by adding.

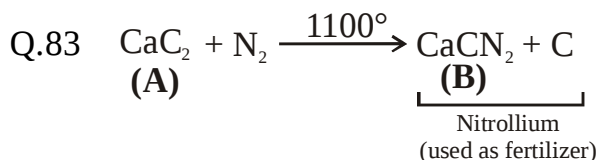
- (A) CH_3SiCl_3
- (B) $(\text{CH}_3)_3\text{SiCl}$
- (C) $(\text{CH}_3)_2\text{SiCl}_2$
- (D) $(\text{CH}_3)_4\text{Si}$

Q.81 Which of the following gases is not a green house gas?

- (A) CO
- (B) O_3
- (C) CH_4
- (D) water vaporous

Q.82 Which among the following are ionic carbide?

- (A) CaC_2
- (B) Al_4C_3
- (C) Be_2C
- (D) All of these



The ratio of π bonds in A to B is :

- (A) 1 (B) 0.5 (C) 2 (D) 0

Q.84 If the number of Silicon atoms is restricted to 23 only, what would be the number of oxygen atoms and magnitude of negative charges respectively in the structure of Pyroxene (single chain Silicate)?

- (A) 70,48 (B) 70, 46 (C) 23, 48 (D) 23, 46

Q.85 Which of the following is correct order of boiling point?

- (A) $\text{CCl}_4 > \text{SiCl}_4$ (B) $\text{SiCl}_4 > \text{CCl}_4$ (C) $\text{SiCl}_4 = \text{CCl}_4$ (D) None of these

Q.86 Comment on the C–C bond length for C_2H_6 and C_2F_6 compounds.

- (A) $d_{\text{C-C}}(\text{C}_2\text{H}_6) > d_{\text{C-C}}(\text{C}_2\text{F}_6)$ (B) $d_{\text{C-C}}(\text{C}_2\text{F}_6) > d_{\text{C-C}}(\text{C}_2\text{H}_6)$
 (C) $d_{\text{C-C}}(\text{C}_2\text{F}_6) = d_{\text{C-C}}(\text{C}_2\text{H}_6)$ (D) Can't be predicted

Q.87 Tin dissolves in boiling caustic soda solution because of the formation of soluble

- (A) $\text{Sn}(\text{OH})_2$ (B) $\text{Sn}(\text{OH})_4$ (C) Na_2SnO_3 (D) SnO_2

Q.88 $\text{CF}_3\text{I} + \text{OH}^- \longrightarrow ?$

The products are

- (A) $\text{CF}_3\text{OH} + \text{I}^-$ (B) $\text{CF}_3\text{O}^- + \text{I}^- + \text{H}_2\text{O}$
 (C) $\text{CHF}_3 + \text{OI}^-$ (D) No reaction due to repulsion from l.p. of F-atoms

Q.89 In which of following silicate two oxygen atoms are shared per tetrahedron.

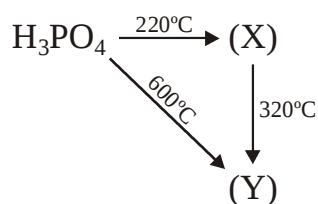
- (A) Ortho silicate (B) Pyro silicate
 (C) Double chain silicate (D) 4-membered cyclic silicate

Q.90 Which is not a ortho silicate?

- (A) $\text{Be}_2[\text{SiO}_4]$ (B) $\text{Zn}_2[\text{SiO}_4]$ (C) ZrSiO_4 (D) $\text{Sc}_2[\text{Si}_2\text{O}_7]$

Nitrogen Family

Q.91



- (A) (X) = Pyrophosphoric acid (liquid), (Y) = Metaphosphoric acid (liquid)
 (B) (X) = Pyrophosphoric acid (liquid), (Y) = Metaphosphoric acid (solid)
 (C) (X) = Pyrophosphoric acid (solid), (Y) = Metaphosphoric acid (solid)
 (D) (X) = Pyrophosphoric acid (solid), (Y) = Metaphosphoric acid (liquid)

Q.92 Select the compound in which HCl is **NOT** the product of Hydrolysis

- (A) NCl_3 (B) PCl_3 (C) AsCl_3 (D) BiCl_3

Q.93 $\text{H}_3\text{PO}_2 \xrightarrow{\Delta} (\text{X}) + \text{PH}_3$; is

- (A) Dehydration reaction (B) Oxidation reaction
 (C) Disproportionation reaction (D) Dephosphorelation reaction

Q.94 Conc. HNO_3 is yellow coloured liquid due to

- (A) Presence of NO in conc. HNO_3 (B) Presence of NO_2 in conc. HNO_3
 (C) Presence of N_2O in conc. HNO_3 (D) Presence of N_2O_3 in conc. HNO_3

Q.95 $\text{H}_3\text{PO}_2 \xrightarrow{140^\circ\text{C}} \text{A} \xrightarrow{250^\circ\text{C}} \text{B} \xrightarrow{316^\circ\text{C}} \text{C}$; compound (C) is

- (A) H_2PO_3 (B) H_2PO_3 (C) HPO_3 (D) $\text{H}_4\text{P}_2\text{O}_7$

Q.96 An explosive compound (A) reacts with water to produce NH_4OH and HOCl . Then, the compound (A), is

- (A) TNG (B) NCl_3 (C) PCl_3 (D) HNO_3

Q.97 A tetra-atomic molecule (A) on reaction with nitrogen(I)oxide, produces two substances (B) and (C). (B) is a dehydrating agent in its monomeric form while substance (C) is a diatomic gas which shows almost inert behaviour. The substances (A) and (B) and (C) respectively will be

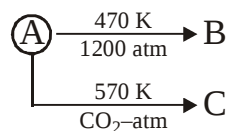
- (A) P_4 , P_4O_{10} , N_2 (B) P_4 , N_2O_5 , N_2 (C) P_4 , P_2O_3 , Ar (D) P_4 , P_2O_3 , H_2

Q.98 The correct order of acidic strength of oxides of nitrogen is

- (A) $\text{NO} < \text{NO}_2 < \text{N}_2\text{O} < \text{N}_2\text{O}_3 < \text{N}_2\text{O}_5$ (B) $\text{N}_2\text{O} < \text{NO} < \text{N}_2\text{O}_3 < \text{N}_2\text{O}_4 < \text{N}_2\text{O}_5$
 (C) $\text{NO} < \text{N}_2\text{O} < \text{N}_2\text{O}_3 < \text{N}_2\text{O}_5 < \text{N}_2\text{O}_4$ (D) $\text{NO} < \text{N}_2\text{O} < \text{N}_2\text{O}_5 < \text{N}_2\text{O}_3 < \text{N}_2\text{O}_4$

- Q.99 Nitrogen dioxide is dissolved in water to produce
(A) HNO_3 and HNO_2 (B) only HNO_3
(C) only HNO_2 (D) HNO_2 and N_2
- Q.100 Which one of the following compounds on strong heating evolves ammonia gas?
(A) $(\text{NH}_4)_2\text{SO}_4$ (B) HNO_3 (C) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ (D) NH_4NO_3
- Q.101 The compound $(\text{SiH}_3)_3\text{N}$ is
(A) pyramidal and more basic than $(\text{CH}_3)_3\text{N}$ (B) planar and less basic than $(\text{CH}_3)_3\text{N}$
(C) pyramidal and less basic than $(\text{CH}_3)_3\text{N}$ (D) planar and more basic than $(\text{CH}_3)_3\text{N}$
- Q.102 Concentrated HNO_3 reacts with iodine to give
(A) HI (B) HOI (C) HOIO_2 (D) HOIO_3
- Q.103 $\text{CH}_2 \begin{matrix} \swarrow \text{COOH} \\ \searrow \text{COOH} \end{matrix} \xrightarrow{\text{P}_4\text{O}_{10}, 150^\circ\text{C}} \text{X}$
Compound (X) is
(A) malonic acid (B) carbon suboxide (C) tartaric acid (D) acetic acid
- Q.104 When AgNO_3 is heated strongly, the products formed are
(A) NO and NO_2 (B) NO_2 and O_2 (C) NO_2 and N_2O (D) NO and O_2
- Q.105 $\text{HNO}_3 + \text{P}_4\text{O}_{10} \longrightarrow \text{HPO}_3 + \text{A}$; the product A is
(A) N_2O (B) N_2O_3 (C) NO_2 (D) N_2O_5
- Q.106 $\text{Ca} + \text{C} \xrightarrow{\Delta} \text{CaC}_2 \xrightarrow{\text{N}_2} \text{A}$
Compound (A) is used as a/an
(A) fertilizer (B) dehydrating agent (C) oxidising agent (D) reducing agent
- Q.107 One mole of calcium phosphide on reaction with excess of water gives
(A) one mole of phosphine (B) two moles of phosphoric acid
(C) two moles of phosphine (D) one mole of phosphorus penta-oxide

Q.108 Three allotropes (A), (B) and (C) of Phosphorous in the following change are respectively



(A) white, black, red (B) black, white, red (C) red, black, white (D) red, violet, black

Q.109 Which oxide of the nitrogen exist in two different forms, which can be interconverted by irradiation with light of the appropriate wavelength

(A) NO_2 (B) N_2O_3 (C) N_2O_5 (D) N_2O

Q.110 As molecular weight increases in 15th group hydrides then which of the following property increases regularly

(A) Boiling point (B) Melting point (C) Thermal stability (D) Reducing nature

Q.111 Which of the following statement is incorrect?

(A) Each P_4O_{10} molecule contains 16 σ bonds and 6 P–O–P bonds.

(B) CaO is used to dry ammonia, while other dehydrating agents conc. H_2SO_4 , P_4O_{10} , CaCl_2 react with NH_3 .

(C) In Holme signal mixture of Ca_3P_2 and CaC_2 are used.

(D) Thermodynamical stability of allotropes of phosphorus: white < black < red.

Q.112 PH_3 produces smoky rings when it comes in contact with air. This is because :

(A) It is inflammable.

(B) It combines with water vapour.

(C) It combines with nitrogen.

(D) burning of PH_3 by P_2H_4 .

Q.113 Ammonium compound which on heating does not give NH_3 is

(A) $(\text{NH}_4)_2\text{SO}_4$

(B) $(\text{NH}_4)_2\text{CO}_3$

(C) NH_4NO_2

(D) NH_4Cl

Q.114 Which statement regarding phosphine is not correct ?

(A) It possess of rotten fish smell

(B) It is obtained in Holme's signal by hydrolysis of Ca_3P_2

(C) It is combustible in nature due to presence of impurity of P_2H_4 along with it.

(D) It is more soluble in water than ammonia

Q.115 Which of the following pairs on heating give same gas?

(A) AgNO_3 , $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

(B) $\text{Pb}(\text{NO}_3)_2$, NH_4NO_3

(C) NH_4NO_2 , NH_4NO_3

(D) NH_4NO_2 , $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

Q.116 Which statement is incorrect?

- (A) Pyrophosphoric acid is tetrabasic acid
- (B) NCl_3 on hydrolysis give NH_3 and HClO
- (C) Cyclotrimetaphosphoric acid is $\text{H}_3\text{P}_3\text{O}_9$ and contains 15 σ bonds.
- (D) PCl_5 on hydrolysis gives H_3PO_3 and HCl

Q.117 Consider the following statements about the reaction between copper metal and dilute HNO_3 ?

- (I) In this reaction NO gas will be released
- (II) Cu metal is oxidised to $\text{Cu}(\text{NO}_3)_2$
- (III) NO is paramagnetic and has one unpaired electron in antibonding molecular orbital
- (IV) NO reacts with O_2 to produce NO_2 which is bent in shape.

Choose the correct statement:

- (A) I, II, III (B) I, III (C) II, IV (D) All are correct

Q.118 Which of the following statement regarding H_3PO_3 is incorrect.

- (A) Its K_a value is less than H_3PO_2 .
- (B) On heating it gives PH_3 and H_3PO_4 .
- (C) It can be prepared by hydrolysis of both PCl_3 and P_4O_6 .
- (D) It is formed during reaction of white phosphorous with alkali.

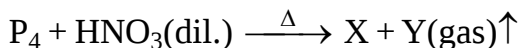
Q.119 Which of the following compound is not directly used as fertilizer because of its explosive nature?

- (A) $\text{Ca}(\text{H}_2\text{PO}_4)_2$ (B) NH_4NO_3 (C) $[\text{CaNCN} + \text{C}]$ (D) $(\text{NH}_4)_2\text{SO}_4$

Q.120 Which of the following does not contain PX_4^+ type cation in solid phase? (X = halogen)

- (A) PF_5 (B) PCl_5 (C) PBr_5 (D) None of these

Q.121 Consider the following reaction and select **INCORRECT** statement about gas (Y) :

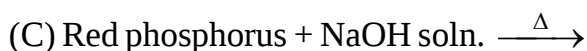
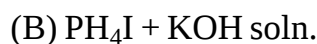
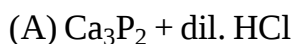


- (A) Gas is paramagnetic in nature (B) Gives neutral solution in water
(C) Forms Brown ring with FeSO_4 solution (D) Disproportionates with water

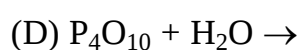
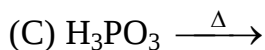
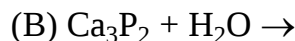
Q.122 Select the **CORRECT** order :

- (A) $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$: Melting point
- (B) $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$: Lewis basicity
- (C) $\text{NH}_3 > \text{SbH}_3 > \text{AsH}_3 > \text{PH}_3$: Boiling point
- (D) $\text{SbH}_3 > \text{AsH}_3 > \text{PH}_3 > \text{NH}_3$: Bond Angle

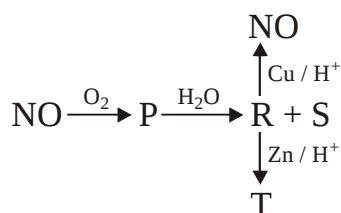
Q.123 Phosphine gas is not prepared by



Q.124 Which of the following reaction does not have atleast one common product



Q.125 Select **INCORRECT** match



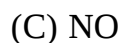
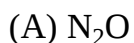
(A) P : Paramagnetic gas

(B) S : Colourless species

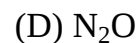
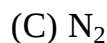
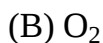
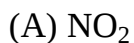
(C) R : Oxidising agent

(D) T : sp^2 Hybridize central atom

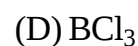
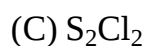
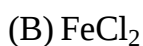
Q.126 Diamagnetic gas neutral towards water is



Q.127 When PbO_2 reacts with conc. HNO_3 then evolved gas is



Q.128 Which of the following chloride does not react with PCl_5 on heating?



Q.129 Which of the following property is common among white phosphorous and red phosphorous

(A) Insolubility in water

(B) Solubility in CS_2

(C) Reaction with NaOH

(D) Phosphorescence

Q.130 Select the **incorrect** statement regarding nitrous acid and nitric acid compound.

(A) Nitric acid is more acidic as compare to Nitrous acid.

(B) O – N – O Bond angle in nitrous acid is less as compare to O – N – O bond angle in Nitric acid.

(C) Both (Nitrous and Nitric) acid has coordinate bond.

(D) Both (Nitrous and Nitric) acid shows H-bonding.

Q.131 When PH_3 absorbed in HgCl_2 solution the corresponding phosphide is obtained

- (A) Hg_2P_3 (B) Hg_3P_2 (C) $\text{Hg}_3(\text{PO}_4)_2$ (D) None of these

Q.132 Calcium phosphide react with water or di. HCl and gives a compound X. Pure X is non inflammable but becomes inflammable owing to the presence of P_2H_4 or P_4 vapours X is absorbed in HI to form compound Y, Y on treating with KOH gives X compound X and Y respectively.

- (A) $\text{X} = \text{PH}_3$ and $\text{Y} = \text{PH}_4\text{I}$ (B) $\text{X} = \text{NaH}_2\text{PO}_2$ and $\text{Y} = \text{H}_4\text{PO}_2$
 (C) $\text{X} = \text{PH}_4^+$ and $\text{Y} = \text{PH}_4\text{I}$ (D) $\text{X} = \text{PH}_3$ and $\text{Y} = \text{H}_4\text{PO}_2$

Q.133 $3\text{HNO}_2 \rightarrow \text{HNO}_2 + \text{H}_2\text{O} + 2\text{NO}$

The incorrect statements regarding this reaction is :

- (A) It is an example of disproportionation reaction.
 (B) +3 oxidation state of N is more stable than +5
 (C) HNO_3 is an example of oxoacids
 (D) +3 oxidation state of changed into +5 and +2 oxidation state.

Q.134 $\text{H}_3\text{PO}_3 \xrightarrow[\text{on heating}]{\Delta} [\text{X}] + [\text{Y}]$
 (gas)

Choose the correct option regarding above reaction.

- (A) [Y] has smell of ammonia. (B) Basicity of [X] is 2
 (C) [X] and [Y] are non-planar (D) [Y] is sp^3 hybridised

Q.135 Which of the following species will not give partial hydrolysed product?

- (A) BiCl_3 (B) PCl_3 (C) BF_3 (D) SiF_4

Q.136 Which is the correct sequence in the following properties. For the correct order, mark (T), and for the incorrect order mark (F) :

- (a) Acidity order : $\text{SiF}_4 < \text{SiCl}_4 < \text{SiBr}_4 < \text{SiI}_4$
 (b) Melting point : $\text{NH}_3 > \text{SbH}_3 > \text{AsH}_3 > \text{PH}_3$
 (c) Boiling point : $\text{NH}_3 > \text{SbH}_3 > \text{AsH}_3 > \text{PH}_3$
 (d) Dipole moment order : $\text{NH}_3 > \text{SbH}_3 > \text{AsH}_3 > \text{PH}_3$
 (A) FTFT (B) TFTF (C) FTTT (D) FFTF

Q.137 Phosphine is not obtained, when

- (A) Red phosphorous is heated with NaOH (B) White phosphorous is heated with NaOH
(C) Ca_3P_2 reacts with water (D) Phosphorous trioxide is boiled with water

Q.138 Which pair of oxides give metallic residue on heating?

- (A) Ag_2O , PbO (B) Ag_2O , HgO (C) HgO , PbO_2 (D) PbO , CuO

Q.139 Match the following mixtures with the respective solution used for their separation:

- | | | |
|------------------------------------|-------------------------------|------------------------------------|
| (a) N_2 & CO | (i) water | |
| (b) N_2 & O_2 | (ii) H_2SO_4 | |
| (c) N_2 & NH_3 | (iii) Ammonical CuCl | |
| (d) PH_3 & NH_3 | (iv) Pyrogallol | |
| (A) a-(iv), b-(iii), c-(ii), d-(i) | | (B) a-(iii), b-(iv), c-(ii), d-(i) |
| (C) a-(iii), b-(iv), c-(i), d-(ii) | | (D) a-(iii), b-(ii), c-(iv), d-(i) |

Q.140 $(\text{X}) \xrightarrow{\text{KOH}} (\text{Y})$ (gas turns red litmus blue) + $(\text{Z}) \xrightarrow{\text{Zn}+\text{KOH}} (\text{Y})$ (gas)

$(\text{X}) \xrightarrow{\Delta} \text{gas}$ (supports in combustion)

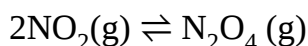
Identify (X) to (Z).

- | | | |
|---|--------------------------|------------------------------------|
| (A) $\text{X} = \text{NH}_4\text{NO}_2$ | $\text{Y} = \text{NH}_3$ | $\text{Z} = \text{KNO}_2$ |
| (B) $\text{X} = (\text{NH}_4)_2\text{Cr}_2\text{O}_7$ | $\text{Y} = \text{NH}_3$ | $\text{Z} = \text{Cr}_2\text{O}_3$ |
| (C) $\text{X} = (\text{NH}_4)_2\text{SO}_4$ | $\text{Y} = \text{NH}_3$ | $\text{Z} = \text{K}_2\text{SO}_4$ |
| (D) $\text{X} = \text{NH}_4\text{NO}_3$ | $\text{Y} = \text{NH}_3$ | $\text{Z} = \text{KNO}_3$ |

Q.141 When NaN_3 solution is treated with H_2S .

- (A) Deposit of sulphur takes place & medium becomes acidic
(B) Colourless gas is evolved & solution becomes alkaline
(C) The gas evolved which causes unconsciousness on inhalation for long time.
(D) The gas evolved which makes $\text{K}_2\text{Cr}_2\text{O}_7$ paper green.

Q.142 When a sample of NO_2 is placed in a container, this equilibrium is rapidly established.



If this equilibrium mixture is a darker colour at high temperatures and at low pressures, which of these statements about the reaction is true?

- (A) The reaction is exothermic and NO_2 is darker in colour than N_2O_4
- (B) The reaction is exothermic and N_2O_4 is darker in colour than NO_2
- (C) The reaction is endothermic and NO_2 is darker in colour than N_2O_4
- (D) The reaction is endothermic and N_2O_4 is darker in colour than NO_2

Q.143 Calcium imide on hydrolysis will give gas (B) which on oxidation by bleaching powder gives gas (C) gas (C) on reaction with magnesium give compound (D). (D) on hydrolysis gives again gas (B). (B), (C) and (D) are

- | | |
|--|--|
| (A) NH_3 , N_2 , Mg_3N_2 | (B) N_2 , NH_3 , MgNH |
| (C) N_2 , N_2O_5 , $\text{Mg}(\text{NO}_3)_2$ | (D) NH_3 , NO_2 , $\text{Mg}(\text{NO}_2)_2$ |

Q.144 Which of the following is true for N_2O ?

- (I) It has linear structure.
- (II) Symmetric $\text{N}-\text{O}-\text{N}$ is a favourable skeleton as compare to $\text{N}-\text{N}-\text{O}$ skeleton.
- (III) Bonds orders are fractional for $\text{N}-\text{N}$ and $\text{N}-\text{O}$ bonds
- (IV) It is ionic in solid state and exists as ion pair.

Choose correct code

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

Q.145 When ammonia gas is passed over hot CuO , a gas is evolved. The same gas is evolved by heating

- | | | | |
|------------------------------|----------------------------|------------------------------|---------------------------------|
| (A) NH_4NO_3 | (B) NH_4Cl | (C) NH_4NO_2 | (D) $\text{CH}_3\text{COONH}_4$ |
|------------------------------|----------------------------|------------------------------|---------------------------------|

Q.146 Which of the following on hydrolysis will give dibasic acid?

- | | | | |
|--------------------|--------------------|--------------------|---------------------|
| (A) PCl_5 | (B) PCl_3 | (C) BCl_3 | (D) SiCl_4 |
|--------------------|--------------------|--------------------|---------------------|

Q.147 Nitrogen can be prepared by :

- | | |
|--|---|
| (A) By decomposition of sodium azide | (B) By decomposition of Ammonium dichromate |
| (C) By decomposition of Ammonium nitrite | (D) All the above |

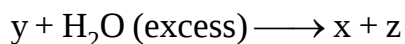
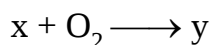
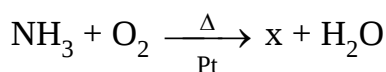
Q.148 Ammonia can not be prepared by :

- | | |
|--------------------------|--------------------------|
| (A) Reduction of nitrite | (B) Reduction of nitrate |
| (C) Reduction of nitride | (D) Hydrolysis of amides |

Q.149 Which metal will give nitrous oxide by cold and dil HNO_3 ?

- (A) Zn (B) Cu (C) Pb (D) Ag

Q.150 In a Ostwald process



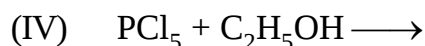
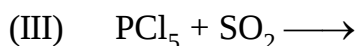
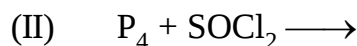
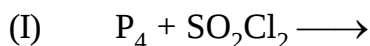
The incorrect option is :

- (A) 'x' shows paramagnetic behaviour (B) 'x' & 'y' are acidic oxide
(C) 'z' can acts as oxidising agent (D) 'y' & 'z' are acidic in nature

Q.151 Very purest form of N_2 is prepared by thermal decomposition of

- (A) NH_4NO_3 (B) NH_4NO_2 (C) $\text{Ba}(\text{N}_3)_2$ (D) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

Q.152 POCl_3 prepared by the reaction of :



- (A) I & III (B) II & III (C) I & IV (D) III & IV

Q.153 Which of the following will give H_2 gas with dilute HNO_3 ?

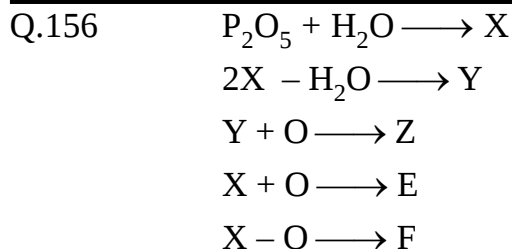
- (A) Mg (B) Zn (C) Cu (D) Hg

Q.154 The catalyst used in Haber's process of production of NH_3 now days is –

- (A) Fe + MO (B) Iron oxide with K_2O and Al_2O_3
(C) Iron oxide with Mo as promoter (D) $\text{Al}_2\text{O}_3 + \text{FeCl}_3$

Q.155 Phosphine is not obtained, when

- (A) Red phosphorous is heated with NaOH
(B) White phosphorous is heated with NaOH
(C) Ca_3P_2 reacts with water
(D) Phosphorous trioxide is boiled with water



Find the sum of π bond in X,Y,Z,E and F ?

- (A) 6 (B) 7 (C) 5 (D) 8

Q.157 Choose the correct statement regarding Allotropes of phosphorous:

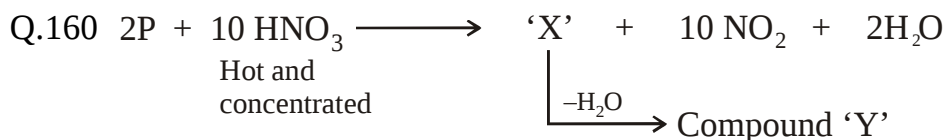
- (A) White phosphorous exist as a discrete P_4 molecules
 (B) Order of reactivity, white phosphorous > Red Phosphorous > Black Phosphorous
 (C) Black phosphorous is a conductor of electricity because it exist in the form of hexagonal layers like graphite.
 (D) All above information regarding allotropes of phosphorous are correct.

Q.158 Which of the following compounds when treated with PCl_5 does not produce POCl_3 ?

- (A) SO_3 (B) H_2O (C) P_4O_{10} (D) CO_2

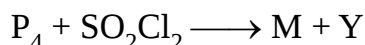
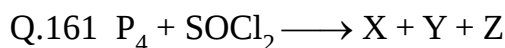
Q.159 Ammonia can be dried by using

- (A) CaCl_2 (B) H_2SO_4 (C) CaO (D) P_4O_{10}



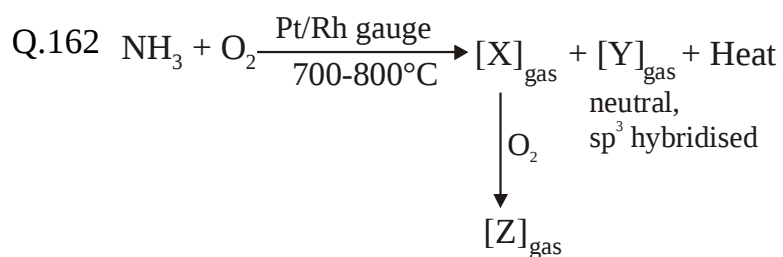
Identified the hybridisation of phosphorous in compound 'Y'.

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



Compound 'Y' is :

- (A) PCl_3 (B) PCl_5 (C) SO_2 (D) S_2Cl_2



Choose **correct** option :

(A) [Z] is sp hybridised

(B) [Z] is diamagnetic

(C) [Z] is planar

(D) [Z] is colourless gas

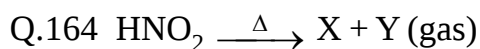
Q.163 Select the nitrogen oxide which shows disproportionation in alkaline medium:

(A) N_2O_3

(B) N_2O_4

(C) N_2O_5

(D) All of these



In above reaction Y (gas) can also be obtained by which of the following reaction:

(A) $\text{Zn} + \text{dil. HNO}_3 \longrightarrow$

(B) $\text{Ag} + \text{very dil. HNO}_3 \longrightarrow$

(C) $\text{Ag} + \text{conc. HNO}_3 \longrightarrow$

(D) $\text{Ag} + \text{dil. HNO}_3 \longrightarrow$

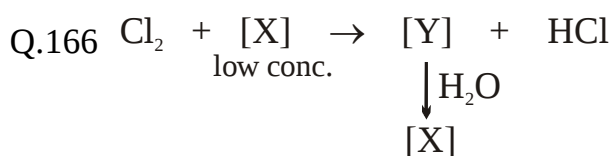
Q.165 Red phosphorus is less reactive than yellow phosphorus because

(A) Its colour is red

(B) It is highly polymerised

(C) It is tetratomic

(D) It is hard



[X] is :

(A) N_2

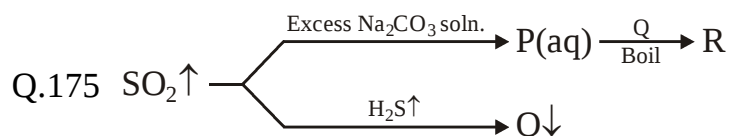
(B) N_2O

(C) NCl_3

(D) NH_3

Oxygen Family

- Q.167 A sulphate of a metal (A) on heating evolves two gases (B) and (C) and an oxide (D). Gas (B) turns $K_2Cr_2O_7$ paper green while gas (C) forms a trimer in which there is no S-S bond. Compound (D) with HCl, forms a Lewis acid (E) which exists as a dimer. Compounds (A), (B), (C), (D) and (E) are respectively
- (A) $FeSO_4$, SO_2 , SO_3 , Fe_2O_3 , $FeCl_3$ (B) $Al_2(SO_4)_3$, SO_2 , SO_3 , Al_2O_3 , $FeCl_3$
(C) FeS , SO_2 , SO_3 , $FeSO_4$, $FeCl_3$ (D) FeS , SO_2 , SO_3 , $Fe_2(PO_4)_3$, $FeCl_2$
- Q.168 The structures of O_3 and N_3^- are
- (A) linear and bent respectively (B) both linear
(C) both bent (D) bent and linear, respectively
- Q.169 Which of the following compound does not liberate oxygen gas on warming with conc. H_2SO_4 ?
- (A) SO_3 (B) PbO_2 (C) MnO_2 (D) CrO_5
- Q.170 A gas which exists in three allotropic forms α , β and γ is
- (A) SO_2 (B) SO_3 (C) CO_2 (D) NH_3
- Q.171 There is no S-S bond in
- (A) $S_2O_4^{2-}$ (B) $S_2O_5^{2-}$ (C) $S_2O_3^{2-}$ (D) $S_2O_7^{2-}$
- Q.172 When an inorganic compound reacts with SO_2 in aqueous medium, produces (A). (A) on reaction with Na_2CO_3 , gives compound (B) which with sulphur, gives a substance (C) used in photography. Compound (C) is
- (A) Na_2S (B) $Na_2S_2O_7$ (C) Na_2SO_4 (D) $Na_2S_2O_3$
- Q.173 When H_2S is passed through dilute nitric acid solution. the product formed is :
- (A) SO_3 (B) Colloidal sulphur (C) SO_2 (D) Plastic sulphur
- Q.174 A pale yellow crystalline solid insoluble in water but soluble in CS_2 is allowed to react with nitric oxide to give X and Y. X is a colourless gas with pungent odour. X is further allowed to react in aqueous medium with nitric oxide to yield Z and T. Compounds X, Z and T are
- (A) SO_3 , H_2SO_3 , N_2O (B) SO_2 , H_2SO_4 , N_2O
(C) SiO_2 , H_2SO_4 , N_2 (D) SO_3 , H_2SO_3 , N_2



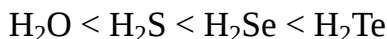
Incorrect statement about 'R' is

- (A) Antichlor agent (B) Fixing agent in photography
(C) Forms ppt with CaCl_2 soln. (D) Reduces Cu^{++} (aq) cation

Q.176 Which of the following statement is **incorrect** for ozone?

- (A) It is thermodynamically less stable than oxygen.
(B) It causes headache
(C) It is diamagnetic in nature.
(D) It oxidises KMnO_4 .

Q.177 For hydrides of 16th group elements, select the property which does not follow the order:



- (A) Bond length (B) Reducing character (C) Bond angle (D) Arrhenius acidic character

Q.178 Which order is **incorrect** :

- (A) $\text{SF}_6 > \text{SeF}_6 > \text{TeF}_6$: Order of stability
(B) $\text{PCl}_5 > \text{SiCl}_4 > \text{AlCl}_3$: Order of hydrolysis
(C) $\text{H}_2\text{O} > \text{H}_2\text{S} > \text{H}_2\text{Se} > \text{H}_2\text{Te}$: Order of thermal stability
(D) $\text{SF}_6 > \text{SeF}_6 > \text{TeF}_6$: Order of hydrolysis

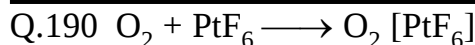
Q.179 Which of the following statement is incorrect ?

- (A) Sulphur molecule in vapour state exist as S_2 and is paramagnetic in nature.
(B) Sulphur and selenium occur as S_8 and Se_8 molecules at room temperature and have puckered ring structure.
(C) Ozone oxidises KMnO_4 .
(D) SO_2 can act both as oxidising as well as reducing agent.

Q.180 Which statement regarding sulphuric acid is **incorrect**?

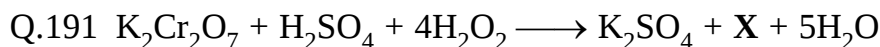
- (A) It is responsible for charring of sugar due to its dehydrating property.
(B) It is obtained in contact process by hydrolysis of oleum.
(C) The value of K_{a2} for H_2SO_4 is greater than its K_{a1} value.
(D) It consists of two $d\pi$ - $p\pi$ bonds and sulphur atom is sp^3 hybridised in it.

- Q.181 Which statement regarding ozone is **incorrect**?
- (A) Ozone is powerful oxidising agent as compared to O_2
(B) Formation of ozone from O_2 is endothermic
(C) Ozone molecule is paramagnetic like oxygen molecule
(D) O_3 is estimated by KI in presence of Borate buffer followed by titration with hypo
- Q.182 Which gas can be dried by conc. H_2SO_4
- (A) NH_3 (B) PH_3 (C) H_2S (D) SO_2
- Q.183 SO_2 is not produced when
- (A) P_4 reacts with $SOCl_2$ (B) S_8 reacts with conc. H_2SO_4
(C) P_4 reacts with SO_2Cl_2 (D) S_8 reacts with conc. HNO_3
- Q.184 Which of the following fluoride does not convert SF_4 into SF_6
- (A) ClF_5 (B) XeF_4 (C) O_2F_2 (D) CsF
- Q.185 Oxygen gas is not evolved when
- (A) Potassium permanganate is heated (B) Sodium peroxide reacts with water at R.T.
(C) Ammonium nitrate is heated (D) Potassium nitrate is heated
- Q.186 When ozone reacts with an excess of potassium iodide solution buffered with a borate buffer (pH = 9.2) iodine is liberated which can be titrated against a standard solution of sodium thiosulphate. this is a quantitative method for estimating O_3 gas. When liberated I_2 and sodium thiosulphate will react. then product is/are
- (A) $S_4O_6^{2-}$ (B) SO_4^{2-} (C) $S_2O_4^{2-}$ (D) S^0
- Q.187 In which of the following reaction SO_2 gas is not produced
- (A) $S_8 + \text{conc. } H_2SO_4 \xrightarrow{\text{warm}}$ (B) $S_8 + \text{conc. } HNO_3 \xrightarrow{\text{warm}}$
(C) $PbS + O_2 \xrightarrow{\Delta}$ (D) $FeS_2 + O_2 \xrightarrow{\Delta}$
- Q.188 When conc. H_2SO_4 was treated with $K_4[Fe(CN)_6]$, CO gas was evolved. By mistake, somebody used dilute H_2SO_4 instead of conc. H_2SO_4 then the gas evolved was
- (A) CO (B) HCN (C) N_2 (D) CO_2
- Q.189 Which gas is responsible for green house effect :
- (A) CO_2 (B) SO_2 (C) CO (D) SO_3



Choose the **correct** option:

- (A) Oxygen is O_2^- and paramagnetic (B) Oxygen is O_2^{2-} and diamagnetic
(C) Oxygen is O_2^+ and diamagnetic (D) Oxygen is O_2^+ and paramagnetic



What is the oxidation state of chromium in product 'X'?

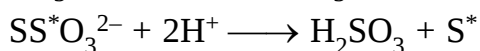
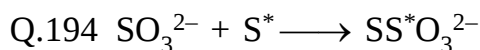
- (A) +10 (B) +6 (C) +7 (D) +5

Q.192 The dipole moment of H_2O_2 is more than that of H_2O but H_2O_2 is not a good solvent because

- (A) it has a very high dielectric constant so that ionic compounds cannot be dissolved in it
(B) it does not act as an oxidising agent
(C) it acts as a reducing agent
(D) it dissociates easily and acts as an oxidising agent in chemical reactions

Q.193 $\text{K}_4[\text{Fe}(\text{CN})_6]$ reacts with ozone to give

- (A) Fe_2O_3 (B) $\text{Fe}(\text{OH})_2$ (C) $\text{K}_3[\text{Fe}(\text{CN})_6]$ (D) KNO_3



The above reaction sequence proves

- (A) Two sulphur atoms of thiosulphate are not equivalent
(B) Both are equivalent
(C) Both of the above are correct
(D) None of these

Q.195 In most of the reactions of ozone, oxygen is one of the product and it is considered as

- (A) Reduction product (B) Oxidation product
(C) Thermal decomposition product (D) Disproportionated product

Q.196 Select the correct statements regarding the products obtained when $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ is subjected to strong heating.

- (I) Disproportionation reaction takes place
(II) Na_2SO_3 and Na_2S_5 are produced.
(III) Na_2SO_4 and Na_2S_5 are produced.
(IV) One of the products has zig-zag open chain structure.
(A) I, II, IV (B) I, III, IV (C) II, III, IV (D) I, II, III, IV

Q.197 The correct order of relative rate of hydrolysis is :

- (A) $\text{SF}_6 < \text{SeF}_6 < \text{TeF}_6$ (B) $\text{SF}_6 < \text{TeF}_6 < \text{SeF}_6$
(C) $\text{TeF}_6 < \text{SeF}_6 < \text{SF}_6$ (D) $\text{TeF}_6 < \text{SF}_6 < \text{SeF}_6$

Q.198 Sewage containing organic waste should not be disposed in water bodies because it causes major water pollution. Fishes in such a polluted water die because of :

- (A) large number of mosquito
(B) increase in the amount of dissolved oxygen in water
(C) decrease in the amount of dissolved oxygen in water.
(D) clogging of gills by mud.

Q.199 The temporary bleaching property is shown by

- (A) SO_2 (B) H_2O_2 (C) HOCl (D) CaOCl_2

Q.200 $2 \times \text{sulphuric acid} - \text{H}_2\text{O} + \text{O} \rightarrow \text{X}$

$2 \times \text{sulphurous acid} - \text{H}_2\text{O} = \text{Y}$

Which option is **correct** for above information?

- (A) X has S–O–S bond (B) Y has S–O–S bond
(C) Y has S–S bond (D) X has S–S bond

Q.201 Select the metal sulphide which is yellow in colour -

- (A) ZnS (B) Ag_2S (C) As_2S_3 (D) CoS

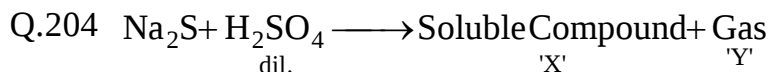
Q.202 **Tom Says :** Among 16th group elements tendency of catenation is maximum for sulphur.

Jerry Says : S–S bond is stronger than O–O single bond.

- (A) Tom is true & Jerry is also true and Jerry give the correct explanation for Tom statement.
(B) Tom is true & Jerry is also true and Jerry does not give the correct explanation for Tom statement.
(C) Tom is false & Jerry is true.
(D) Tom is true & Jerry is false.

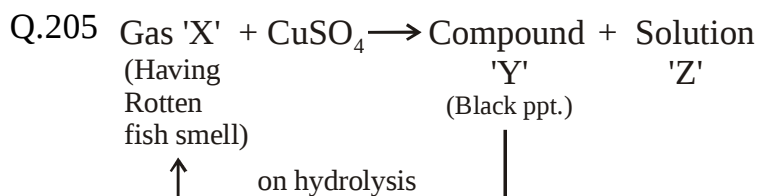
Q.203 Which ion can not be oxidised by ozone?

- (A) $\text{I}^\ominus$ (B) AsO_3^{3-} (C) $[\text{Fe}(\text{CN})_6]^{3-}$ (D) MnO_4^{2-}



Select the correct statement regarding products 'X' and 'Y'

- (A) Hybridisation of sulphur in 'X' can not predict.
 (B) Geometry of 'Y' is bent.
 (C) Hybridisation of sulphur in 'Y' is sp^3
 (D) Both compound 'X' and 'Y' react with moist $\text{Pb}(\text{OAc})_2$ solution to form white precipitate.



Black precipitate 'Y' is :

- (A) Cu_2O (B) ZnS (C) Cu_3P_2 (D) Cu_2S

Halogen Family

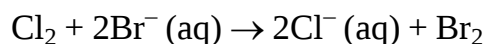
Q.206 Which halogen oxidizes water at room temperature but does not undergo disproportionation into it?

- (A) F_2 (B) Cl_2 (C) Br_2 (D) I_2

Q.207 Chlorine gas is not produced by heating

- (A) SOCl_2 (B) PbCl_4 (C) FeCl_3 (D) Hg_2Cl_2

Q.208 Bromine is commercially prepared from sea water by displacement reaction



Br_2 gas thus formed is dissolved into solution of Na_2CO_3 and then pure Br_2 is obtained by treatment of the solution with

- (A) $\text{Ca}(\text{OH})_2$ (B) NaOH (C) H_2SO_4 (D) HI

Q.209 Which of the following combination doesnot evolve Cl_2 gas

- (A) $\text{HCl} (\text{aq}) + \text{KMnO}_4$ (B) $\text{HCl} + \text{MnO}_2$
 (C) $\text{HCl} + \text{Br}_2$ (D) $\text{HCl} + \text{F}_2$

Q.210 Which reaction has positive value of ΔG°

- (A) $\text{F}_2 + \text{H}_2\text{O} \xrightarrow{\text{R.T.}} 2\text{HF} + \frac{1}{2} \text{O}_2 \uparrow$ (B) $\text{Cl}_2 + \text{H}_2\text{O} \xrightarrow{\text{R.T.}} \text{HCl} + \text{HOCl}$
 (C) $\text{Br}_2 + \text{H}_2\text{O} \xrightarrow{\text{R.T.}} \text{HBr} + \text{HOBr}$ (D) $\text{I}_2 + \text{H}_2\text{O} \xrightarrow{\text{R.T.}} \text{HI} + \text{HOI}$

Q.211 Vander Waal forces of attraction is the correct reason for which of the following statement.

- (A) I_2 is solid, Br_2 is liquid while F_2 and Cl_2 are gases
- (B) Acidic nature: $HF < HCl < HBr < HI$
- (C) H_2O_2 is more viscous than H_2O
- (D) CH_3OH is more soluble in water than higher molecular weight alcohols

Q.212 Which products are expected from disproportionation of hypochlorous acid?

- (A) $HClO_3$ and Cl_2O
- (B) $HClO_2$ and $HClO_4$
- (C) HCl and Cl_2O
- (D) HCl and $HClO_3$

Q.213 Correct order of boiling point

- (A) $F_2 > Cl_2 > Br_2$
- (B) $F_2 > Br_2 > Cl_2$
- (C) $Cl_2 > Br_2 > F_2$
- (D) $Br_2 > Cl_2 > F_2$

Q.214 For which of the following reaction, blue colouration is not observed in presence of starch

- (A) $I^- (aq) + H^+ (aq) \xrightarrow{\text{atm air}}$
- (B) $I^- (aq) + \text{dil } H_2SO_4 \longrightarrow$
- (C) $I^- (aq) + Fe^{3+} (aq) \longrightarrow$
- (D) $I^- (aq) + Cu^{++} (aq) \longrightarrow$

Q.215 Which of the property follow given order; $F_2 > Cl_2$

- (A) Oxidising property
- (B) Bond length
- (C) Bond energy
- (D) Absorbed wavelength

Q.216 $NaOCl$ on heating gives

- (A) Sodium chlorides and sodium chlorate
- (B) Sodium chlorite and sodium chlorate
- (C) sodium chlorite and sodium chlorides
- (D) Sodium chlorite and sodium perchlorate

Q.217 $Cl_2 + F_2(\text{excess}) \xrightarrow{573 K} (P)$ (Inter halogen compound with bent-T-Shape)

Select the incorrect statement regarding (P)

- (A) Polar molecule
- (B) Conducts electricity in liquid state
- (C) Diamagnetic substance
- (D) Non planar molecule

Q.218 Which set of properties follow given order: $HClO < HClO_2 < HClO_3 < HClO_4$

- (i) Acidic nature
- (ii) Oxidising nature
- (iii) Thermal stability
- (iv) $Cl-O$ single bond length
- (A) Only (i)
- (B) Only (i) & (iii)
- (C) Only (i), (ii) & (iii)
- (D) All of these

Q.219 Which pair of species can't be prepared by conc. H_2SO_4

- (A) HCl , HBr (B) HCl , H_3PO_4 (C) H_3PO_4 , HNO_3 (D) HBr , HNO_3

Q.220 Which of the following species is not a pseudohalide?

- (A) CNO^- (B) RCOO^- (C) OCN^- (D) N_3^-

Q.221 When chlorine gas is passed through an aqueous solution of a potassium halide in the presence of chloroform, a violet colouration is obtained. On passing more of chlorinated water, the violet colour disappears and the solution becomes colourless. This test confirms the presence of which of the following halide in aqueous solution.

- (A) chloride (B) fluoride (C) bromide (D) iodide

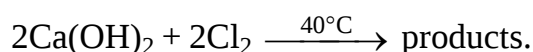
Q.222 Conc. H_2SO_4 cannot be used to prepare HBr from NaBr because it

- (A) reacts slowly with NaBr (B) oxidises HBr
(C) reduces HBr (D) disproportionates HBr

Q.223 Halogens are coloured, this is due to

- (A) Absorption of radiations in visible region.
(B) Absorption of radiations in Infra red region
(C) Absorption of radiations in Ultra-violet region.
(D) None of these

Q.224 In the following reaction.



Oxidation states of chlorine in products is :

- (A) -1 , $+1$ (B) -1 , $+3$ (C) -1 , $+5$ (D) 0 , $+1$

Q.225 Which of the following halogen oxide is used for estimation of carbon monoxide in automobile exhaust gases?

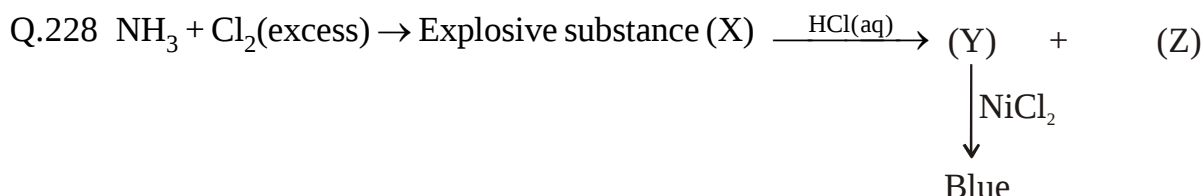
- (A) Cl_2O_7 (B) I_2O_5 (C) ClO_2 (D) BrO_3

Q.226 Concentrated HNO_3 reacts with iodine to give

- (A) HI (B) HOI (C) HOIO_2 (D) HOIO_3

Q.227 Reaction which is feasible at room temperature is :

- (A) $\text{Cl}_2 - \text{water} + \text{Br}^- \longrightarrow$ (B) $\text{Br}_2 - \text{water} + \text{I}^- \longrightarrow$
 (C) $\text{I}_2 - \text{water} + \text{Cl}^- \longrightarrow$ (D) Both (A) and (B)



The products (Y) and (Z) are respectively:

- (A) NH_3 & Cl_2 (B) N_2 & Cl_2 (C) $\text{NH}_2 - \text{NH}_2$ & Cl_2 (D) $\text{HN} = \text{NH}$ & Cl_2

Q.229 The **correct** order of thermal stability is :

- (A) $\text{HOCl} < \text{HClO}_3 < \text{HClO}_2 < \text{HClO}_4$ (B) $\text{HOCl} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$
 (C) $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$ (D) $\text{HClO}_4 < \text{HClO} < \text{HClO}_2 < \text{HClO}_3$

Q.230 In the hydrolysis of ICl , the products are -

- (A) $\text{HI} + \text{HCl}$ (B) $\text{HI} + \text{HOCl}$ (C) $\text{HCl} + \text{HOI}$ (D) $\text{HOCl} + \text{HOI}$

Q.231 A reddish pink substance on heating gives off a vapour which condenses on the sides of the test tube and the substance turns blue. On cooling, if water is added to the residue, it turns to its original colour. The substance is

- (A) Iodine crystals (B) Copper sulphate crystals
 (C) Cobalt chloride crystals (D) Zinc oxide

Q.232 Which of the following reaction is feasible

- (A) $2\text{HBr} + \text{I}_2 \longrightarrow 2\text{HI} + \text{Br}_2$ (B) $\text{H}_2\text{SO}_4 + 2\text{HCl} \longrightarrow \text{SO}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$
 (C) $2\text{HI} + \text{F}_2 \longrightarrow 2\text{HF} + \text{I}_2$ (D) $\text{NH}_3 + \text{HF} \longrightarrow \text{NH}_4\text{F}$

Q.233 Only iodine forms hepta-fluoride IF_7 , but chlorine and bromine give penta-fluorides. The reason for this is

- (A) low electron affinity of iodine
 (B) unusual pentagonal bipyramidal structure of IF_7
 (C) that the larger iodine atom can accommodate more number of smaller fluorine atom around it
 (D) low chemical reactivity of IF_7

Q.234 Thermally most stable compound is

- (A) HOClO_3 (B) HOClO_2 (C) HOCl (D) HOClO

Q.235 The interhalogen compound that exist is

- (A) IBr_3 (B) ICl_7 (C) IF_5 (D) BrF_4

Q.236 Cl_2 disproportionate in :

- (A) H_2O , NaOH (B) H_2O , dil. H_2SO_4
(C) NaOH , dil. H_2SO_4 (D) dil. H_2SO_4 , conc. H_2SO_4

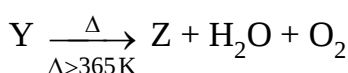
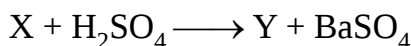
Q.237 What is the oxidation state of oxygen in X, where X is most stable compound of oxygen and fluorine?

- (A) +2 (B) -1 (C) +1 (D) -2

Q.238 Which compound is most powerful bleaching agent?

- (A) Cl_2 (B) CaOCl_2 (C) O_3 (D) H_2O_2

Q.239 $\text{Cl}_2(\text{g}) + \text{Ba}(\text{OH})_2 \longrightarrow \text{X}(\text{aq}) + \text{BaCl}_2 + \text{H}_2\text{O}$



Y and Z are respectively

- (A) HClO_4 , ClO_2 (B) HClO_3 , ClO_2 (C) HClO_3 , ClO_6 (D) HClO_4 , Cl_2O_7

Q.240 The reaction which is consistent with the fact that $\text{Cl}_2\text{O}_6(\text{s})$ exists as $[\text{ClO}_2^+][\text{ClO}_4^-]$, would be

- (A) $\text{Cl}_2\text{O}_6 + \text{NaOH} \rightarrow \text{NaClO}_3 + \text{NaClO}_4 + \text{H}_2\text{O}$
(B) $\text{Cl}_2\text{O}_6 + \text{HF} \rightarrow \text{ClO}_2\text{F} + \text{HClO}_4$
(C) $2\text{HClO}_4 + \text{P}_2\text{O}_5 \rightarrow 2\text{HPO}_3 + \text{Cl}_2\text{O}_7$
(D) $2\text{ClO}_2 + 2\text{O}_3 \xrightarrow{0^\circ\text{C}} \text{Cl}_2\text{O}_6 + 2\text{O}_2$

Q.241 Which of the following does not conduct electricity in the fused state?

- (A) NaCl (B) CaF_2 (C) MgCl_2 (D) AlCl_3

Q.242 A black powder (A) when heated with NaCl and conc. H_2SO_4 gives off a greenish yellow gas (B). Gas 'B' on passing through boiling KOH yields compounds, one of which when heated with the black powder evolves oxygen. (A) and (B) respectively are

- (A) MnO_2 , Cl_2 (B) Pb_3O_4 , Br_2 (C) MnO_2 , Br_2 (D) Pb_3O_4 , Cl_2

Q.243 Violet colour of iodine is decolourised by :

- (A) Hot and Concentrated NaOH (B) $\text{Na}_2\text{S}_2\text{O}_3$
 (C) Concentrated HNO_3 (D) All of these

Q.244 The bleaching property of chlorine water is due to-

- (A) Formation of nascent oxygen (B) Formation of nascent chlorine
 (C) Formation of O_3 (D) Reducing property of Cl_2

Q.245 Chlorine can be obtained by which of the following process.

- (A) Electrolysis of molten NaCl (B) $\text{NaCl} + \text{NaOCl} \xrightarrow{\text{Acidic}}$
 (C) $4\text{HCl} + \text{O}_2 \xrightarrow{\text{CuCl}_2}$ (D) All of these

Q.246 The principal products obtained on heating iodine with concentrated caustic soda solution are

- (A) $\text{NaOI} + \text{NaI}$ (B) $\text{NaIO}_3 + \text{NaI}$
 (C) $\text{NaOI} + \text{NaIO}_3 + \text{NaI}$ (D) $\text{NaIO}_4 + \text{NaI}$

Q.247 $\text{F}_2 + \text{NaOH conc.} \longrightarrow \text{X} + \text{Y} + \text{Z (gas)}$

In above reaction Z (gas) is:

- (A) H_2 (B) O_2 (C) F_2 (D) Na_2 (vapour)

Q.248 $\text{Cl}_2 + \text{NH}_3 \rightarrow [\text{X}] + \text{HCl}$
 Concentration lowered down beyond the limit

Choose incorrect option :

- (A) [X] is sp^3 hybridised (B) [X] is explosive in nature
 (C) [X] is pyramidal (D) [X] is NH_4Cl

Inert Gases

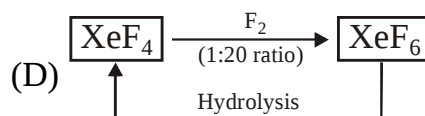
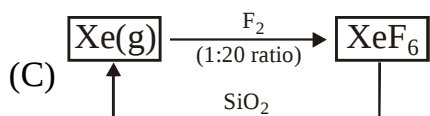
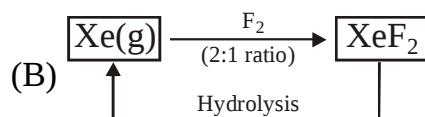
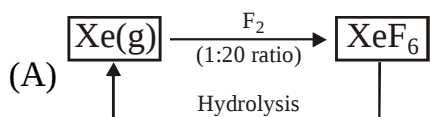
Q.249 First compound of inert gases was prepared by scientist Neil Barthlete in 1962. This compound is

- (A) XePtF_6 (B) XeO_3 (C) XeF_6 (D) XeOF_4

Q.250 Which of the following Xenon compound does not produce explosive XeO_3 on its complete hydrolysis:

- (A) XeO_2F_2 (B) XeF_2 (C) XeF_4 (D) XeF_6

Q.251 Which of the following diagrams is correct related to Xe ?



Q.252 Solubility of inert gases increases as atomic number increases due to increase in

- (A) Dipole-dipole interaction
 (B) Dipole-induced dipole interaction
 (C) Induced dipole-instantaneous dipole interaction
 (D) Hydrogen bonding

Q.253 Select the property which does not follow given order: $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$

- (A) Solubility in water (B) Boiling point (C) Liquefaction (D) Ionization energy

Q.254 In which of the following reaction XeF_6 acts as fluoride acceptor

- (A) $\text{XeF}_6 + \text{AsF}_5 \rightarrow [\text{XeF}_5]^+ [\text{AsF}_6]^-$ (B) $\text{XeF}_6 + \text{SbF}_5 \rightarrow [\text{XeF}_5]^+ [\text{SbF}_6]^-$
 (C) $\text{XeF}_6 + \text{CsF} \rightarrow \text{Cs}^+ [\text{XeF}_7]^-$ (D) $\text{XeF}_6 + \text{PF}_5 \rightarrow [\text{XeF}_5]^+ [\text{PF}_6]^-$

Q.255 Which order regarding xenon fluorides is incorrect:

- (A) XeF_2 , XeF_4 and XeF_6 are colourless crystalline solids
 (B) All xenon fluorides are readily hydrolysed
 (C) XeO_3 is obtained by complete hydrolysis of both XeF_4 and XeF_6
 (D) XeOF_4 and XeO_2F_2 are obtained by complete hydrolysis of XeF_6

Q.256 Which statement regarding XeF_6 is incorrect?

- (A) It gives XeO_3 on complete hydrolysis which is a explosive solid
 (B) It is not kept in glass vessels as it decomposes silica of glass.
 (C) XeF_6 reacts with RbF to form $\text{Rb}^+ [\text{XeF}_7]^-$
 (D) It is reducing in nature

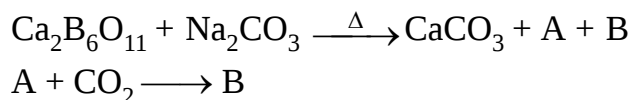
- Q.257 Which order regarding inert gases is incorrect?
- (A) $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$: Order of M.P and B.P
(B) $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$: Order of adsorption on coconut charcoal
(C) $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$: Order of polarisability
(D) $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$: Order of Ionization energy
- Q.258 XeF_4 molecule is:
- (A) Tetrahedral and acts as fluoride donor with SbF_5
(B) Square planar and acts as fluoride donor with PF_5
(C) Square planar and acts as fluoride donor with NaF
(D) See Saw shape and acts as a fluoride donor with AsF_5
- Q.259 XeF_6 undergoes partially and completely Hydrolysis and gives different Xenon compounds, select the **CORRECT** statement regarding Xenon compounds formed on Hydrolysis.
- (A) All have planer geometry.
(B) All are oxo-flouro xenon compounds.
(C) All are non planer and polar.
(D) All have different hybridisation and different number of lone pairs on central atom.
- Q.260 The decreasing order $\text{Xe} > \text{Kr} > \text{Ar} > \text{Ne} > \text{He}$, is correct for
- | | | | |
|-------------------|-------------------------|--------------------|---------------------------|
| (1) boiling point | (2) solubility in water | (3) polarisability | (4) Ease of liquification |
| (A) only 1 | (B) 1, 2, 3, 4 | (C) 1, 2, 4 | (D) 2, 4 |
- Q.261 Which of the following is not the correct characteristic property of noble gases.
- (A) Higher degree of diffusibility.
(B) Producing inert atmosphere.
(C) All can easily be stored by clathrate formation.
(D) Their fluorides hydrolyse at room temperature.
- Q.262 Which of the following noble gases does not form clathrates?
- | | | | |
|--------|-------------------|--------|--------|
| (A) He | (B) Br_2 | (C) Ar | (D) Xe |
|--------|-------------------|--------|--------|

EXERCISE-2

[MULTIPLE CORRECT CHOICE TYPE]

- Q.1 Which of the following reaction will give H_3BO_3 (Boric Acid)?
(A) $\text{B}_2\text{O}_3 + \text{H}_2\text{O} \rightarrow$ (B) $\text{BCl}_3 + \text{H}_2\text{O} \rightarrow$
(C) $\text{Na}_2\text{B}_4\text{O}_7 + \text{H}_2\text{O} + \text{HCl} \rightarrow$ (D) $\text{B}_2\text{H}_6 + \text{H}_2\text{O} \rightarrow$
- Q.2 $\text{BF}_3 + \text{LiAlH}_4 \xrightarrow{\text{Dry ether}} \text{'X'} + \text{LiF} + \text{AlF}_3$
One molecule of compound 'X' reacts with two molecules of
(A) ROR (B) PH_3 (C) CO (D) Pyridine
- Q.3 Which of the following statements is/are correct regarding B_2H_6 ?
(A) banana bonds are longer but stronger than terminal B–H bonds
(B) B_2H_6 is also known as 3c–2e compound
(C) hybridisation of B in B_2H_6 is sp^3
(D) it cannot be prepared by reacting BF_3 with LiAlH_4 in the presence of dry ether
- Q.4 When an inorganic compound (X) having 3c–2e as well as 2c–2e bonds reacts with ammonia gas at a certain temperature, gives a compound (Y) which is iso-structural with benzene. Compound (X) with ammonia at a high temperature, produces a hard substance (Z). Then
(A) (X) is B_2H_6 (B) (Z) is known as inorganic graphite
(C) (Z) having structure similar to graphite (D) (Z) having structure similar to (X)
- Q.5 $\text{Al}_2(\text{SO}_4)_3 + \text{NH}_4\text{OH} \longrightarrow \text{X}$, then
(A) X is a white coloured compound (B) X is insoluble in excess of NH_4OH
(C) X is soluble in NaOH (D) X can not be used as an antacid
- Q.6 Select correct statement about B_2H_6
(A) Bridging groups are electron-deficient with 12 valence electrons
(B) It has 2c - 2e B–H bonds
(C) It has 3c - 2e B–H–B bonds
(D) All of above are correct statements
- Q.7 Which of the following compound(s) give precipitate with solution of chrome alum:
(A) BaCl_2 (B) Na_2CO_3 (C) $(\text{NH}_4)_2\text{S}$ (D) excess KOH

Q.8 Which of the following option is / are correct?



- (A) B contains 5 B–O–B linkage
- (B) A will be obtained by thermal decomposition of B
- (C) Aqueous solution of B used as a acidic buffer in titration
- (D) A exist in a polymeric form.

Q.9 Aqueous solution of boric acid is treated with Salicylic acid. Which of the following statements is/are **incorrect** for the product formed in the above reaction

- (A) No product will be formed because both are acid.
- (B) Product is 4-coordinated complex and optically resolvable.
- (C) Product is 4-coordinated complex and optically non resolvable
- (D) There are two ring only which are five membered.

Q.10 Which of the following option is/are incorrect the most acidic halide among Boron halides?

- (A) It is volatile halide.
- (B) It is most thermal stable halide.
- (C) It form strong $p\pi-p\pi$ back bond.
- (D) It can form $[\text{BX}_4^-]$

Q.11 Choose the correct statements:

- (A) In B_2H_6 molecule bond strength of bridge bond is greater than terminal B–H bond.
- (B) In trisilyl amine maximum seven atoms are present in one plane and nitrogen has sp^3 hybridisation.
- (C) Borax give blue bead with CuSO_4 salt.
- (D) Borate salt on react with methanol in presence of concentrated H_2SO_4 to form a compound which give green edge flame.

Q.12 The correct statement(s) related to allotropes of carbon is/are

- (A) graphite is the most stable allotropes of carbon and having a two dimensional sheet like structure of hexagonal rings of carbon (sp^2)
- (B) diamond is the hardest allotrope of carbon and having a three dimensional network structure of $\text{C}(sp^3)$
- (C) fullerene (C_{60}) is recently discovered non-crystalline allotrope of carbon having a football-like structure.
- (D) Vander Waal's force of attraction acts between the layers of graphite.

Q.13 Which of the following is / are correct for group 14 elements?

- (A) The stability of dihalides are in the order $\text{CX}_2 < \text{SiX}_2 < \text{GeX}_2 < \text{SnX}_2 < \text{PbX}_2$
- (B) The ability to form $p\pi-p\pi$ multiple bonds among themselves increases down the group
- (C) The tendency for catenation decreases down the group
- (D) They all form oxides with the formula MO_2

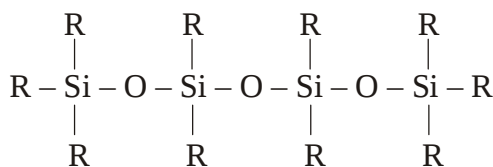
Q.14 Which is/are correct options?

- (A) In diamond each C-atom is tetrahedrally surrounded by 4-equidistant neighbour.
- (B) Diamond has the highest thermal conductivity of any known substance.
- (C) Diamond shows less electrical conductivity as compare to graphite.
- (D) Graphite is harder than diamond.

Q.15 Silane is more reactive than CH_4 due to

- (A) larger size of Si compared to C which facilitates the attack by nucleophile.
- (B) Polarity of Si-H bond is opposite to that of C-H bond.
- (C) Availability of vacant 3d orbitals in case of Si to form the reaction intermediate easily.
- (D) Si-H bond energy is lower than that of C-H bond.

Q.16 In the following Silicone, select the alkyl / aryl substituted silicon chlorides which are used in formation of given Silicones:



(A) R SiCl_3

(B) R_2SiCl_2

(C) R_3SiCl

(D) R_4Si

Q.17 Which of the following is not true?

- (A) In SiF_4 , Si - F bond length is greater than the sum of the radius of Si and F.
- (B) In SiF_4 , Si - F bond length is small than the sum of the radius of Si and F.
- (C) In SiF_4 , Si - F bond length is equal than the sum of the radius of Si and F.
- (D) None of these

Q.18 Nitric oxide gas is evolved by

- (A) $\text{Zn} + \text{dil HNO}_3$
- (B) $\text{FeSO}_4(\text{aq}) + \text{dil HNO}_3$
- (C) $\text{Pb} + \text{Hot dil HNO}_3$
- (D) Air oxidation of NH_3

Q.19 Phosphine gas is prepared by

- (A) $\text{Ca}_3\text{P}_2 + \text{dil. HCl}$
- (B) $\text{PH}_4\text{I} + \text{KOH soln.}$
- (C) Red phosphorus + NaOH soln. $\xrightarrow{\Delta}$
- (D) $\text{P}_4 + \text{NaOH soln.} \xrightarrow{\Delta}$

Q.20 $\text{PCl}_5(\text{g}) + \text{Ag} \xrightarrow{\Delta} \text{x} + \text{y}$

Where product 'x' is water insoluble but 'y' reacts with water, then product 'x' is soluble in solution of:

- (A) KCN
- (B) $\text{Na}_2\text{S}_2\text{O}_3$
- (C) dil. HNO_3
- (D) NH_3

Q.21 Which of the following reaction is/are correct?

- (A) $\text{PCl}_3 + 3\text{H}_2\text{O} \longrightarrow \text{H}_3\text{PO}_3 + 3\text{HCl}$ (B) $\text{NCl}_3 + 3\text{H}_2\text{O} \longrightarrow \text{NH}_3 + 3\text{HOCl}$
(C) $\text{SbCl}_3 + 3\text{H}_2\text{O} \longrightarrow \text{H}_3\text{SbO}_3 + 3\text{HCl}$ (D) $\text{BiCl}_3 + \text{H}_2\text{O} \longrightarrow \text{BiOCl} + 2\text{HCl}$

Q.22 $\text{CaCN}_2 + \text{H}_2\text{O} \longrightarrow$ solid + gas, same gas can also be produced from

- (A) $(\text{NH}_4)_2\text{S} \xrightarrow{\Delta}$ (B) $(\text{NH}_4)_2\text{SO}_4 \xrightarrow{\Delta}$
(C) $\text{Na}(\text{NH}_4)\text{HPO}_4 \cdot 4\text{H}_2\text{O} \xrightarrow{\Delta}$ (D) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \xrightarrow{\Delta}$

Q.23 Which of the following is false for allotropes of phosphorus

- (A) yellow phosphorus is soluble in CS_2 while red phosphorus does not
(B) P – P – P bond angle is 60° in red phosphorus
(C) On heating in air white phosphorus changes to red
(D) white phosphorus changes to black phosphorus at ordinary temperature

Q.24 Which of the following equation is/are correctly written?

- (A) $\text{P}_4 + 20\text{HNO}_3 \xrightarrow{\Delta} 4\text{H}_3\text{PO}_4 + 20\text{NO}_2\uparrow + 4\text{H}_2\text{O}$
(B) $\text{I}_2 + 10\text{HNO}_3 \xrightarrow{\Delta} 2\text{HIO}_4 + 10\text{NO}_2\uparrow + 4\text{H}_2\text{O}$
(C) $\text{S} + 6\text{HNO}_3 \xrightarrow{\Delta} \text{H}_2\text{SO}_4 + 6\text{NO}_2\uparrow + 2\text{H}_2\text{O}$
(D) $\text{Sn} + 4\text{HNO}_3 \xrightarrow{\Delta} \text{H}_2\text{SnO}_3 + 4\text{NO}_2\uparrow + 2\text{H}_2\text{O}$

Q.25 Which of the following compounds is/are directly used as fertilizer?

- (A) $\text{Ca}_3(\text{PO}_4)_2$ (B) $\text{Ca}(\text{H}_2\text{PO}_4)_2$ (C) CaNCN (D) $(\text{NH}_4)_2\text{SO}_4$

Q.26 Aqueous solution of NH_3 gas is basic because.

- (A) NH_3 undergoes self dissociation in water
(B) NH_3 acts as electrolyte in water
(C) NH_4^+ ion forms stronger hydrogen bond with water than NH_3 molecule does with water
(D) NH_3 molecules reduce concentration of H^+ ions that are furnished from H_2O .

Q.27 Which of the following reaction(s) liberate NH_3 gas.

- (A) Heating of NH_4ClO_4 (B) Heating of $(\text{NH}_4)_2\text{C}_2\text{O}_4$
(C) $\text{CaCN}_2 + \text{H}_2\text{O}$ (D) $\text{Li}_3\text{N} + \text{H}_2\text{O}$

Q.28 Which combination gives H_3PO_4

- (A) $\text{P}_4 + \text{SOCl}_2$ (B) $\text{H}_3\text{PO}_3 + \text{Br}_2$ (C) $\text{P}_4 + \text{SO}_2\text{Cl}_2$ (D) $\text{P}_4 + \text{conc. H}_2\text{SO}_4$



gas 'Y' forms precipitate with

- (A) CuSO_4 soln. (B) AgNO_3 soln. (C) $\text{Hg}(\text{NO}_3)_2$ soln. (D) HBr acid

Q.30 Correct statement(s) for N_2O gas is/are:

- (A) It is acid anhydride of $\text{H}_2\text{N}_2\text{O}_2$.
 (B) On heating with sodium metal it does not produce metal nitride.
 (C) N_2O can be separated from NO by passing the gaseous mixture into aqueous FeSO_4 solution.
 (D) Bond order of $\text{N}-\text{N}$ bond in $\text{N}_2\text{O} > 2.0$

Q.31 In which of the following reactions NH_3 gas evolution occurs.

- (A) $\text{NO}_3^- + \text{Zn} + \text{dil H}_2\text{SO}_4 \xrightarrow{\text{warm}}$ (B) $\text{NH}_4^+ \text{ salt} + \text{NaOH} \xrightarrow{\Delta}$
 (C) $\text{AlN} + \text{steam} \longrightarrow$ (D) $\text{CH}_3\text{COONH}_4 \xrightarrow{\Delta}$

Q.32 Choose the **correct** options

- (A) Conjugate base of hydrazoic acid is N_3^- .
 (B) $d_{\text{N-N}}$ bond length in N_2H_4 is more as compare to $d_{\text{N-N}}$ in N_2F_4
 (C) In triazene (N_3H_3) all nitrogen atoms are sp^2 hybridised
 (D) In cyclotriazene (N_3H) all $\text{N}-\text{N}$ bond length are equal

Q.33 Which of the following reactions would evolve nitrogen gas under suitable condition?

- (A) $\text{NH}_4\text{IO}_3 \xrightarrow{\Delta} ?$ (B) $\text{Ca}(\text{OCl})\text{Cl} + \text{NH}_3 \longrightarrow ?$
 (C) $\text{NH}_3 + \text{CuO} \longrightarrow ?$ (D) $\text{Ba}(\text{N}_3)_2 \xrightarrow{\Delta} ?$

Q.34 The reactions which produce N_2 gas are :

- (A) $\text{H}_2\text{N}-\text{SO}_3\text{H} + \text{HNO}_2 \rightarrow$ (B) $\text{CO}(\text{NH}_2) + \text{HNO}_2 \rightarrow$
 (C) $\text{CS}(\text{NH}_2)_2 + \text{HNO}_2 \rightarrow$ (D) $\text{NO}_2^- + \text{N}_3^- + 2\text{H}^+ \rightarrow$

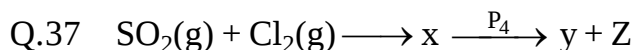


Products are :

- (A) $\text{Cu}(\text{NO}_3)_2$ (B) N_2O (C) NO (D) NO_2

Q.36 The ozone layer forms natural in stratosphere by

- (A) the interaction of CFC with oxygen (B) the interaction of UV radiation with oxygen
 (C) the interaction of IR radiation with oxygen (D) the interaction of oxygen and water vapour



Then X, Y and Z can be.

- (A) SOCl_2 (B) SO_2Cl_2 (C) SO_2 (D) PCl_5

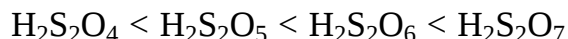
Q.38 When a compound X reacts with ozone in aqueous medium, a compound Y is produced, Ozone also reacts with Y and produces compound Z. Z acts as an oxidising agent, then X, Y and Z will be

- (A) $\text{X} = \text{HI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_3$ (B) $\text{X} = \text{acidified KI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_3$
(C) $\text{X} = \text{KI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_4$ (D) $\text{X} = \text{HI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_4$

Q.39 Which of the following characteristics is/are shown by sulphur dioxide?

- (A) coloured gas
(B) Ability to turn acidified dichromate paper green
(C) Ability to decolourise acidified KMnO_4 solution
(D) D: acts lewis acid

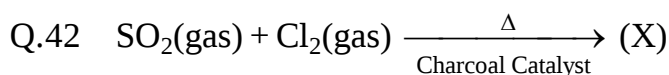
Q.40 Which propertie(s) is/are following given order



- (A) Acidic strength (B) Number of $(\text{p}\pi - \text{d}\pi)$ bond
(C) Oxidation state of sulphur (D) Number of acidic hydrogen

Q.41 Which substance(s) can show oxidative bleaching action.

- (A) CaOCl_2 (B) SO_2 (C) MgO_2 (D) $\text{Na}_2\text{S}_2\text{O}_3$



CORRECT statement(s) about compound (X) is/are

- (A) It is a dehydrating agent
(B) It undergoes hydrolysis via $\text{S}_{\text{N}}\text{AE}$ reaction
(C) Its aqueous solution gives white ppt with BaCl_2 solution
(D) It contains one $(\text{d}\pi - \text{p}\pi)$ bond

Q.43 Na_2CO_3 solution $\xrightarrow[\text{excess}]{\text{SO}_2}$ (A) $\xrightarrow{\text{NaIO}_3 \text{ solution}}$ (B) (final product).

Which of the following statements is/ are correct regarding 'B'.

(A) It has no electrical conductivity in solid state but conducts electricity in liquid state.

(B) It is highly soluble in water.

(C) It produces blue solution with starch.

(D) It produces the same oxidation state on reaction with excess Cl_2 water as that of 2nd reagent used above.

Q.44 If ozone absorb red light then emitted colour of ozone is

(A) Orange

(B) Blue

(C) Indigo

(D) Yellow

Q.45 Which of the following property is correctly match for halogens

(A) $\text{F}_2 < \text{Cl}_2 < \text{Br}_2 < \text{I}_2$: Boiling point

(B) $\text{F} > \text{Cl} > \text{Br} > \text{I}$: Ionisation energy

(C) $\text{Cl}_2 > \text{Br}_2 > \text{F}_2 > \text{I}_2$: bond dissociation energy

(D) $\text{F}^-(\text{aq}) > \text{Cl}^-(\text{aq}) > \text{Br}^-(\text{aq}) > \text{I}^-(\text{aq})$: electrical conductance

Q.46 Which of the following statement(s) is/are correct regarding inter-halogen compounds of AB_x types?

(A) x may be 1, 3, 5 and 7

(B) A is a more electronegative halogen than B

(C) FBr_3 cannot exist

(D) Only IF_7 is non polar inter halogen compound

Q.47 Acidic character of HF increases appreciably on mixing it with :

(A) XeF_2

(B) BF_3

(C) PF_5

(D) SiF_4

Q.48 When a compound X reacts with ozone in aqueous medium, a compound Y is produced. Ozone also reacts with Y and produces compound Z. Z acts as an oxidising agent, then X, Y and Z will be

(A) $\text{X} = \text{HI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_3$

(B) $\text{X} = \text{KI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_3$

(C) $\text{X} = \text{KI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_4$

(D) $\text{X} = \text{HI}$, $\text{Y} = \text{I}_2$ and $\text{Z} = \text{HIO}_4$

Q.49 Identify the correct statements:

(A) Fluorine is a super halogen

(B) Iodine shows basic nature

(C) AgF is insoluble in water

(D) SCN^- is a pseudohalide

Q.50 Which of the following fumes is moist air?

(A) TiCl_4

(B) AlCl_3

(C) BeCl_2

(D) BCl_3

- Q.51 The decreasing order $\text{Xe} > \text{Kr} > \text{Ar} > \text{Ne} > \text{He}$, is correct for
 (A) boiling point (B) solubility in water (C) polarisability (D) Ease of liquification
- Q.52 Which of the following Combination of reactants produce chemical change
 (A) $\text{ClF}_5 + \text{NaF}$ (B) $\text{ClF}_3 + \text{XeF}_2$ (C) $\text{SF}_6 + \text{XeF}_4$ (D) $\text{B(OH)}_3 + \text{HF}$
- Q.53 $\text{Xe} + \text{F}_2 \xrightarrow{1:20} \text{X} \xrightarrow{\text{H}_2\text{O}} \text{Y} \xrightarrow{\text{H}_2\text{O}} \text{Z} \xrightarrow{\text{H}_2\text{O}} \text{XeO}_3$
 Select **correct** option(s) for X, Y, Z and given chemical change
 (A) X, Y and Z are in same oxidation state
 (B) All have equal number of lone pair on central atom
 (C) All are non-planar
 (D) All have equal number of covalent bonds
- Q.54 Which of the following reaction(s) of xenon compounds is/are feasible?
 (A) $\text{XeF}_2 + \text{HF} \longrightarrow [\text{XeF}]^+ [\text{HF}_2]^-$
 (B) $\text{XeF}_4 + \text{RbF} \longrightarrow \text{Rb}^+ [\text{XeF}_5]^-$
 (C) $\text{XeF}_4 + \text{PF}_5 \longrightarrow [\text{XeF}_3]^+ [\text{PF}_6]^-$
 (D) $2\text{XeF}_6 + 3\text{SiO}_2 \xrightarrow{\text{R.T.}} 2\text{XeO}_3 + 3\text{SiF}_4$
- Q.55 Which substance(s) is/are acting as refrigerant?
 (A) Solid CO_2 (B) liquid nitrogen (C) liquid NH_3 (D) liquid helium
- Q.56 Correct statement(s) for hydrolysis of XeF_4 is/are:
 (A) It is disproportionation reaction.
 (B) It is dangerous to store XeF_4 in moist glass vessel.
 (C) 1.5 moles of oxygen is liberated for three moles of XeF_4 .
 (D) Hybridization of xenon atom changes.

[REASONING TYPE]

- Q.57 **Statement-I :** $\text{NaBO}_3/\text{OH}^-$ can be used for oxidation of Cr^{3+} to Cr^{6+}
Statement-II : In alkaline medium NaBO_3 produces H_2O_2
 (A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
 (B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
 (C) If Statmemt-I is True but the Statmemt-II is False.
 (D) If Statmemt-I is False but the Statmemt-II is True.

- Q.58 **Statement-I :** SiCl_4 undergoes hydrolysis whereas CCl_4 does not.
Statement-II : Silicon has vacant d-orbitals in its valence shell whereas carbon does not.
(A) If both Statement-I & Statement-II are True & the Statement-II is a correct explanation of the Statement-I.
(B) If both Statement-I & Statement-II are True but Statement-II is not a correct explanation of the Statement-I.
(C) If Statement-I is True but the Statement-II is False.
(D) If Statement-I is False but the Statement-II is True.
- Q.59 **Statement - I :** Hydrated calcium silicate in mild basic medium contains the discrete unit of $\text{Si}(\text{OH})_6^{2-}$.
Statement - II : Calcium silicate undergoes hydrolysis to produce silicic acid which under mild alkaline condition produces $\text{Si}(\text{OH})_6^{2-}$ complex.
(A) If both Statement-I & Statement-II are True & the Statement-II is a correct explanation of the Statement-I.
(B) If both Statement-I & Statement-II are True but Statement-II is not a correct explanation of the Statement-I.
(C) If Statement-I is True but the Statement-II is False.
(D) If Statement-I is False but the Statement-II is True.
- Q.60 **Statement-I :** Carbonates and silicates are isostructural
Statement-II : Carbon and silicon atoms have same number of valence shell electrons
(A) If both Statement-I & Statement-II are True & the Statement-II is a correct explanation of the Statement-I.
(B) If both Statement-I & Statement-II are True but Statement-II is not a correct explanation of the Statement-I.
(C) If Statement-I is True but the Statement-II is False.
(D) If Statement-I is False but the Statement-II is True.
- Q.61 **Statement-1 :** Rate of conversion of GeCl_2 , SnCl_2 and PbCl_2 by Cl_2 into GeCl_4 , SnCl_4 and PbCl_4 respectively decreases from GeCl_2 to PbCl_2 .
Statement-2 : From Ge to Pb, M–Cl bond energy decreases and promotion energy for M^{2+} to M^{4+} is not compensated due to inert pair effect.
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.

- Q.62 **Statement-1** : Pb^{4+} has higher electronegativity as compared to Pb^{2+} .
Statement-2: Pb^{4+} is less stable than Pb^{2+} .
(A) Statement-1 is true, Statement-2 is true and Statement-2 is correct explanation for Statement-1
(B) Statement-1 is true, Statement-2 is true and Statement-2 is **NOT** the correct explanation for Statement-1
(C) Statement-1 is true, Statement-2 is false
(D) Statement-1 is false, Statement-2 is true
- Q.63 **Statement-I** : There is a very little difference in acidic-strengths of H_3PO_4 , H_3PO_3 and H_3PO_2 .
Statement-II : Number of unprotonated oxygen responsible for increase of acidic-strength due to inductive effect remains the same.
(A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
(B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
(C) If Statmemt-I is True but the Statmemt-II is False.
(D) If Statmemt-I is False but the Statmemt-II is True.
- Q.64 **Statement-I** : PCl_5 and PbCl_4 are thermally unstable
Statement-II : They produce same gas on thermal decomposition
(A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
(B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
(C) If Statmemt-I is True but the Statmemt-II is False.
(D) If Statmemt-I is False but the Statmemt-II is True.
- Q.65 **Statement-I** : Red phosphorus is less volatile then white phosphorus.
Statement-II: Red phosphorus has a discrete tetrahedral structure.
(A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
(B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
(C) If Statmemt-I is True but the Statmemt-II is False.
(D) If Statmemt-I is False but the Statmemt-II is True.

- Q.66 **Statement -1** : White phosphorus & Sulphur both disproportionate with NaOH producing their respective hydrides as one of the product. But Phosphorus does not come back on acidification of disproportionated products.
- Statement -2** : PH_3 is gaseous substance.
- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is false, statement-2 is true.
(D) Statement-1 is true, statement-2 is false.
- Q.67 **Statement-I** : Oxygen is more electronegative than sulphur, yet H_2S is acidic, while H_2O is neutral.
Statement-II : H-S bond is weaker than O-H bond.
- (A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
(B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
(C) If Statmemt-I is True but the Statmemt-II is False.
(D) If Statmemt-I is False but the Statmemt-II is True.
- Q.68 **Statement-1**: In Caro's acid sulphur atom is sp^3 hybridized state.
Statement-2: Caro's acid contains one peroxy O_2^{2-} linkage.
- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.
- Q.69 **Statement-I** : Conc. H_2SO_4 can not be used to prepare pure HBr from NaBr
Statement-II : It reacts slowly with NaBr .
- (A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
(B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
(C) If Statmemt-I is True but the Statmemt-II is False.
(D) If Statmemt-I is False but the Statmemt-II is True.

- Q.70 **Statement -I :** Bleaching action of chlorine is permanent while that of SO_2 is temporary.
Statement -II : Chlorine bleaches by reduction and SO_2 by oxidation.
- (A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
(B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
(C) If Statmemt-I is True but the Statmemt-II is False.
(D) If Statmemt-I is False but the Statmemt-II is True.
- Q.71 **Statement-I :** Cl_2 gas undergoes disproportionation in hot and concentrated caustic soda (NaOH) solution.
Statement-II : NaCl and NaOCl are the products formed.
- (A) If both Statmemt-I & Statmemt-II are True & the Statmemt-II is a correct explanation of the Statmemt-I.
(B) If both Statmemt-I & Statmemt-II are True but Statmemt-II is not a correct explanation of the Statmemt-I.
(C) If Statmemt-I is True but the Statmemt-II is False.
(D) If Statmemt-I is False but the Statmemt-II is True.
- Q.72 **Statement-1:** HF is not stored in glass bottles.
Statement-2: HF is only the liquid halogen acid.
- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.
- Q.73 **Statement-1:** He and Ne do not form clathrate compound.
Statement-2: Down the group of inert gases, induction by the dipole increases.
- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.

[PARAGRAPH TYPE]**Paragraph for question nos. 74 to 75**

The chemical nature of boron is influenced primarily by its small size and high ionization energy, and these factors, coupled with the similarity in electronegativity of B, C and H, lead to an extensive and unusual type of covalent molecular species. The availability of only 3 electrons contribute to covalent bonding involving the four orbitals s , p_x , p_y and p_z confers a further range of properties of Boron leading to electron pair acceptor behaviour (Lewis acidity) and multicentre bonding.

- Q.74 Which compound does not form when B_2H_6 reacts with NH_3 at room temperature or higher temperature.
 (A) $BH_3 \leftarrow NH_3$ (B) $[BH_2(NH_3)_2][BH_4]$
 (C) $B_3N_3H_6$ (D) inorganic graphite
- Q.75 Which of the following compound gives H_3BO_3 / $H[B(OH)_4]$ on hydrolysis.
 (I) B_2H_6 (II) $Na_2B_4O_7$ (III) BCl_3 (IV) B_2O_3
 (A) Only I (B) Only I, III (C) I, III, IV (D) All of these

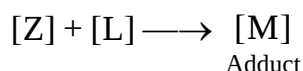
Paragraph for question nos. 76 to 78

	F	Cl	Br
B	Monomer	Monomer	X
Al	Ionic	Polymer (W)	Y
Ga	Ionic	Dimer	Z

- Q.76 The compound (X) exists as
 (A) Monomer (B) Dimer (C) Polymer (D) Trimer
- Q.77 Select the correct statement(s) regarding the compounds (W) and (Z).
 (A) Coordination number of Al in the compound (W) is 6
 (B) Coordination number of Ga in the compound (Z) is 4.
 (C) The compound (Z) exists as dimer.
 (D) All of these
- Q.78 Which of the following statements is correct for the compound (Y)?
 (A) It exists as polymer and the coordination number of Al is 6.
 (B) It exists as dimer and the coordination number of Al is 4.
 (C) It exists as monomer.
 (D) None of these

Paragraph for question nos. 79 & 80

It is clear that $[\text{BH}_3]$ is a fugitive reaction species it exists only at exceedingly low concentration but can be isolated and studied using matrix isolation techniques. Thus it can be generated by thermal dissociation of loosely bound 1:1 ligand, H^- is a species case since it gives the symmetrical tetrahedral ion BH_4^- isoelectronic with CH_4 and NH_4^+ . Many other complexes of BH_3 with N, P, As, O, S etc. donor atoms are also known and they readily formed by symmetrical homolytic cleavage of the bridge bonds in B_2H_6 .



The most stable adduct formed by $[\text{Z}]$ with $[\text{L}]$ then L is :

- (A) PF_3 (B) CO (C) Me_2S (D) Py

Q.80 Choose correct option w.r.t. B_2H_6

- (A) CO gives unsymmetrical cleavage.
 (B) NH_3 , MeNH_2 and Me_2NH gives unsymmetrical cleavage.
 (C) H^- form less stable adduct as compare to Me_3N .
 (D) Bond length of bridge bond is less than terminal bond length in B_2H_6

Paragraph for question nos. 81 to 82

Silicones are organo-silicon synthetic polymers. These are formed by the hydrolysis of alkyl or aryl substituted chloro silanes and their subsequent Polymerisation. The alkyl and aryl substituted chloro silanes are prepared by the reaction of Grignard reagent and SiCl_4 . The lower silicones are oily liquids but higher members containing long chains or ring structures are waxy and rubber like solids. They are good electrical insulators and are used in making vaseline like greases which are used as lubricants in aeroplanes.

Q.81 Find the value of n, for which compound $(\text{CH}_3)_n\text{Si}(\text{Cl})_{4-n}$ on hydrolysis followed by polymerisation gives cross linked silicone

- (A) 1 (B) 2 (C) 3 (D) None

Q.82 Which of the following is correct about silicones?

- (A) Silicones are organo silicon compounds containing Si–O–Si linkage
 (B) R_3SiCl on hydrolysis followed by subsequent polymerisation gives linear silicones
 (C) RSiCl_3 on hydrolysis followed by subsequent polymerisation gives linear silicones
 (D) When water is eliminated from the terminal –OH groups of linear silicones, cross linked silicones are formed

Paragraph for question nos. 83 & 84

The term carbide is generally applied to compounds in which carbon is bonded to the elements of lower or approximately same electronegativity. This definition excludes the compounds in which oxygen, sulphur, phosphorus nitrogen and halogens are united with carbon. Reactive metals (i.e. of group 1 and 2) form ionic carbides. They hydrolyse to liberate hydrocarbons. Most of them resembles with NaCl in crystal structure. Transition metals forms interstitial carbides.

Q.83 Read the following statement regarding metal carbide.

- (I) All metal carbides are ionic
 (II) CaC_2 has one sigma and two pi bonds
 (III) Be_2C on hydrolysis forms amphoteric hydroxide
 (IV) SiC is 3-D covalent solid compound having sp^2 hybridised Si atoms

Choose the correct options :

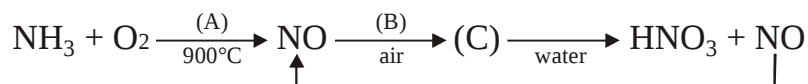
- (A) Only II (B) II and III (C) II, III and IV (D) II and IV

Q.84 Select the correct order of hydrolysis:

- (I) $\text{SnCl}_2 < \text{SnCl}_4$ (II) $\text{FeCl}_2 < \text{FeCl}_3$ (III) $\text{AgF} > \text{AgI}$ (IV) $\text{PbF}_2 > \text{PbI}_2$
 (A) I only (B) I and IV (C) I and II (D) I, II, III and IV

Paragraph for question nos. 85 to 86

The following flow diagram represents the industrial preparation of nitric acid from ammonia:



Answer the questions given below:

Q.85 Which line of entry describes the undefined reagents, products and reaction conditions?

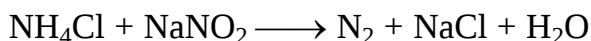
- | | A | B | C |
|-----|----------|-----------------------------|------------------------|
| (A) | catalyst | R.T. (25°C) | NO_2 |
| (B) | catalyst | R.T. (25°C) | N_2O |
| (C) | catalyst | high pressure | NO_2 |
| (D) | catalyst | high pressure | N_2O_3 |

Q.86 Formation of HNO_3 when (C) is dissolved in H_2O takes place through various reactions. Select the reaction not observed in this step.

- (A) $\text{NO}_2 + \text{H}_2\text{O} \longrightarrow \text{HNO}_3 + \text{HNO}_2$ (B) $\text{HNO}_2 \longrightarrow \text{H}_2\text{O} + \text{NO} + \text{NO}_2$
 (C) $\text{NO}_2 + \text{H}_2\text{O} \longrightarrow \text{HNO}_3 + \text{NO}$ (D) none of these

Paragraph for question nos. 87 to 88

In laboratory dinitrogen is prepared by treating an aqueous solution of NH_4Cl & NaNO_2 .



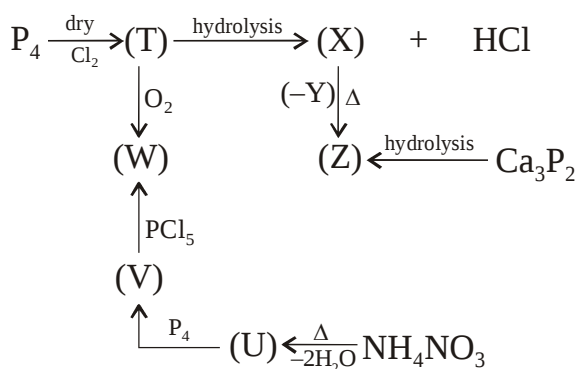
Small amount of gas 'X' and compound 'Y' is also formed in this reaction.

Q.87 Gas 'X' can be prepared by

- (A) Heating of $\text{Pb}(\text{NO}_3)_2$ (B) by treating Zn with conc. HNO_3
 (C) by treating Fe with dil. HNO_3 (D) by treating FeS with dil. HNO_3

Q.88 Compound 'Y' is

- (I) oxidising agent (II) reducing agent (III) strong acid (IV) dehydrating agent
 (A) Only I & II (B) Only I & III (C) Only I & IV (D) Only I & III, IV

Paragraph for question nos. 89 to 91

Q.89 The compound (W) can also be obtained by the reaction(s).

- (A) $\text{PCl}_5 + \text{H}_2\text{SO}_4 \longrightarrow ?$ (B) $\text{PCl}_5 + \text{SO}_2 \longrightarrow ?$
 (C) $\text{PCl}_5 + \text{H}_2\text{O} \longrightarrow ?$ (D) $\text{PCl}_5 + \text{O}_2 \longrightarrow ?$
 (Equimolar ratio)

Q.90 Select the correct statement(s)?

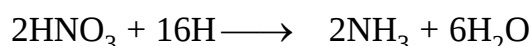
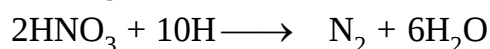
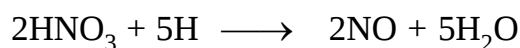
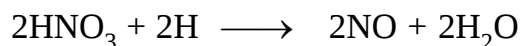
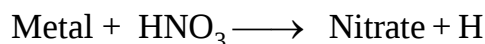
- (A) Heating of (X) involves disproportionation.
 (B) Heating of NH_4NO_3 to get (U) involves disproportionation
 (C) The compound (U) supports combustion.
 (D) Formation of (Z) by treating P_4 with caustic soda involves disproportionation.

Q.91 The gas (U) is

- (A) neutral oxide (B) oxidising agent
 (C) also obtained by treating zinc with dilute HNO_3 (D) linear in shape.

Paragraph for question nos. 92 & 93

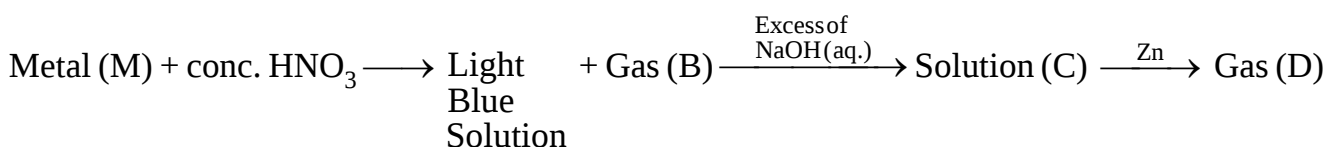
Nitric acid reacts with most of the metal (Except Noble metals like gold and platinum) and non metals. Towards its reaction with metals HNO_3 acts as an acid as well as an oxidising agent like other acids HNO_3 liberate Nascent hydrogen from metals which further reduces the nitric acid into number of products like NO , NO_2 , N_2O , N_2 , NH_2OH or NH_3 according to the following reactions:



Q.92 Which reaction can be used to prepare laughing gas?

- (A) Reaction of Sn with very dil. HNO_3 (B) Reaction of Hg with dil. HNO_3
 (C) Reaction of Zn with dil. HNO_3 (D) Reaction of Cl with HNO_3

Q.93 Metal (M) + very dil. $\text{HNO}_3 \longrightarrow$ No reaction



Select correct statement:

- (A) Solution (C) is only NaNO_2
 (B) Gas (B) is diamagnetic
 (C) Gas (C) has sp^3 hybridisation in their transition state
 (D) Gas (B) has sp^2 hybridisation.

Paragraph for question nos. 94 to 96

Among Halogens, F_2 is most reactive Halogen and under controlled conditions when it reacts with other Halogens like Cl_2 , Br_2 and I_2 then tetra-atomic, Hexa-atomic and an octa-atomic interhalogen compounds are formed respectively.

Q.94 Non-polar interhalogen molecule is

- (A) Tetra-atomic (B) Hexa-atomic (C) Octa-atomic (D) None of these

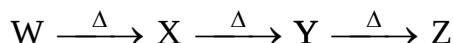
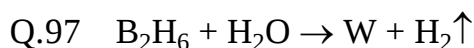
Q.95 Planar interhalogen molecule is

- (A) Tetra-atomic (B) Hexa-atomic (C) Octa-atomic (D) None of these

Q.96 Which of the following species does not exist?

- (A) ClI_3 (B) IF_5 (C) ICl_2^- (D) BrF_4

[MATCH THE COLUMN]

**Column-I**

(P) W

(Q) X

(R) Y

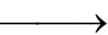
(S) Z

Column-II(1) B_2O_3 (2) HBO_2 (3) $\text{H}_2\text{B}_4\text{O}_7$ (4) H_3BO_3

Q.98 Match the column-

Column-I (Reactions)

(A) Borax

(B) $\text{B}_2\text{H}_6 + \text{H}_2\text{O}$ (C) $\text{B}_2\text{H}_6 + \text{NH}_3$ (Excess)(D) $\text{BCl}_3 + \text{LiAlH}_4$ **Column-II (Product)**

(p) BN

(q) B_2H_6 (r) H_3BO_3 (s) $\text{NaBO}_2 + \text{B}_2\text{O}_3$

Q.99 Match the following

Column-I(A) $\text{BBr}_3 + \text{H}_2 \rightarrow \text{B}$ (B) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O} + \text{CuSO}_4 \rightarrow \text{Cu}(\text{BO}_2)_2$ (C) $\text{AlCl}_3 + \text{H}_2\text{O} \rightarrow \text{HCl}$ (D) $\text{Cr}_2\text{O}_3 + \text{Al} \rightarrow \text{Cr}$

(p)

(q)

(r)

(s)

Column-II

Borax bead test

Reduction

White fumes

Hydrolysis

Q.100 **Column I**(A) $\text{Si}_4\text{O}_{13}^{10-}$ (B) SiO_4^{4-} (C) $\text{Si}_4\text{O}_{12}^{8-}$ (D) $\text{Si}_2\text{O}_7^{6-}$ **Column II**

(P)

Negative charge on the anion is equal to the number of terminal oxygen atoms.

(Q)

Three shared corners and ten unshared corners

(R)

Silicon atom(s) is/are present at the center of geometry and every oxygen atom is present at each corner of the geometry.

(S)

Non-planar geometry

(T)

Total number of oxygen atoms shared in between two tetrahedral unit in whole structure is in even number.

Q.101	Column-I (Reactions)	Column-II (Products and type of reaction)
(A)	$P_4O_6 + H_2O \longrightarrow$	(P) H_3PO_3
(B)	$P_4 + NaOH + H_2O \xrightarrow{\Delta}$	(Q) H_3PO_4
(C)	$H_3PO_3 \xrightarrow{\Delta}$	(R) PH_3
		(S) disproportionation.

Q.102	Column-I	Column-II [Hydrolysed products at any condition]
(A)	NF_3	(P) One of the product is anhydride of nitrous acid
(B)	NCl_3	(Q) One of the product is sp^3 hybridised.
(C)	PCl_3	(R) One of the product is ionic with white turbidity.
(D)	$SbCl_3$	(S) One of the product is acidic in nature.
		(T) Tautomerism is observed.

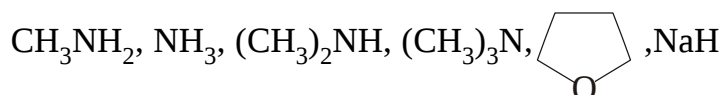
Q.103 Match List-I with List-II

	List-I Chemical reaction	List-II Name of process
I.	$4NH_3 + 5O_2 \xrightarrow{800^\circ C / Pt} 4NO + 6H_2O$	(a) Contact process
II.	$4HCl + O_2 \xrightarrow{3230^\circ C / CuCl_2} 2Cl_2 + 2H_2O$	(b) Ostwald's process
III.	$2SO_2 + O_2 \xrightarrow{450-500^\circ / V_2O_5} 2SO_3$	(c) Deacon's process
IV.	$2N_2 + 3H_2 \xrightarrow{Fe + Mo} 2NH_3$	(d) Haber's process

[INTEGER / SUBJECTIVE TYPE]

Q.104 $2BF_3(g) + 6NaH \xrightarrow{180^\circ C} P(g) + Q(\text{solid})$. Find out maximum number of atom(s) that can lie in a plane of covalent molecule 'P'.

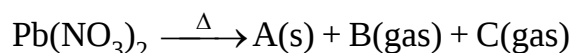
Q.105 Find the number of reagents which would lead to unsymmetrical cleavage of diborane.



Q.106 Find the total number of σ -bonds in hydrated borax.

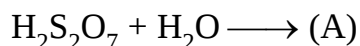
Q.107

- (a) Consider thermal decomposition given below:



When gas (B) is allowed to cool down below -11°C , then it is solidified and exists as ion pair. What is bond order of anion?

- (b) Consider the following equation



When compound (A) is allowed to react with P_2O_5 , compound (C) is formed. How many $d_\pi-p_\pi$ bonds are present in compound (C).

Note : There are two separate parts in this question i.e. part (a) & part (b). Suppose answer for part (a) is P and for part (b) is Q, then final answer of this question will be the form of $P + Q$ in OMR Sheet.

- Q.108 3 moles of SiF_4 are reacted with water, then calculate how many total number of moles of Hexa fluoride silicic acid are formed in product.

- Q.109 How many of the following silicates have two O-atoms shared per tetrahedron?

$\text{Be}_2(\text{SiO}_4)$, $\text{Ca}_2\text{Mg}_5[(\text{Si}_4\text{O}_{11})_2](\text{OH})_2$, $\text{Sc}_2(\text{Si}_2\text{O}_7)$, $\text{Ca}_3(\text{Si}_3\text{O}_9)$, $\text{Be}_3\text{Al}_2(\text{Si}_6\text{O}_{18})$,
 $\text{Mg}_2[(\text{SiO}_3)_2]$, $\text{Al}_2(\text{OH})_4[\text{Si}_2\text{O}_5]$

- Q.110 $4\text{HNO}_3 + \text{P}_4\text{O}_{10} \xrightarrow{-10^\circ\text{C}} 2\text{N}_2\text{O}_5 + (\text{HPO}_3)_4$

Find out the value of expression $|x - y|$ for above reaction

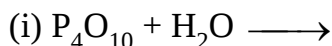
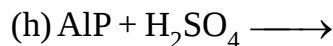
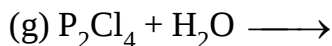
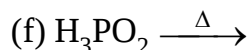
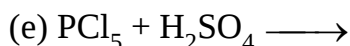
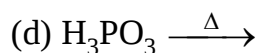
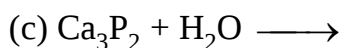
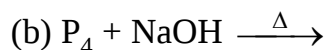
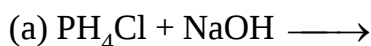
where, x = Maximum number of equal N – O bond length in N_2O_5 .

y = Difference of oxy linkages (P – O – P) between P_4O_{10} and $(\text{HPO}_3)_4$.

- Q.111 How many number of metals will produced NO gas with 20% dil HNO_3

Cu, Fe, Sn, Zn, Hg, Pb, Ag, Au

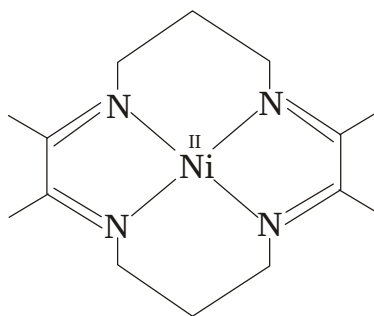
Q.112 How many of the following reactions would produce phosphine gas?



If your answer is 3, write the answer as 0003.

Q.113 How many compounds or elements with PCl_5 give POCl_3 as a minor, major or intermediate product?
 Ag , Sn , H_2O , $\text{C}_2\text{H}_5\text{OH}$, CH_3COOH

Q.114 How many statements are correct for the complex entity?



(a) it is square planar

(b) It is diamagnetic

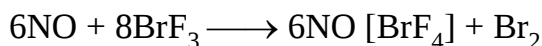
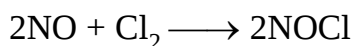
(c) It has 4 chelates.

(d) It has two unpaired electrons.

(e) It exhibits geometrical isomerism

(f) $d_{x^2-y^2}$ orbital of Ni^{2+} ion is involved in its formation.

Q.115 The product formed in the reactions



have the following characteristics.

NOCl gas boiling point : -7°C

$\text{NO}[\text{BrF}_4]$ crystalline melting point 255°C conductor in liquid state in which of these compounds is the NO group bonded by a covalent bond & in which it is in the form of NO^+ ion.

Q.116 Which of the following oxides are amphoteric?

MgO , CaO , FeO , Cu_2O , Ag_2O , Al_2O_3 , PbO , SnO , ZnO , BeO , Na_2O , Cs_2O

[If your answer is 2 then write the answer as 0002.]

Q.117 Two molecules of oil of vitriol (ic-acid of sulphur) $\text{--H}_2\text{O} + \text{O} \rightarrow (\text{X})$.

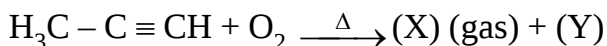
How many sp^3 hybridised atoms are present in compound (X)?

[If your answer is 2 then write the answer as 0002.]

Q.118 How many S–O–S, S–S bonds and total number of lone pair are present respectively in the trimer of SO_3 .

[If your answers are 2,4 and 10 respectively, write the answer as 2410.]

Q.119 Consider the following reaction:



When gas (X) reacts with NaOH, then compound (Z) is formed at room temperature, calculate the bond order of covalent bond present in anionic part of compound (Z).

Q.120 $\text{S}_2\text{O}_3^{2-} + \text{I}_2 \longrightarrow \text{I}^- + \text{X} (\text{ion})$

What is the average oxidation state of central atom of X ion.

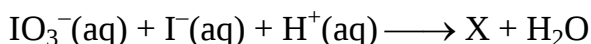
[Multiply your answer by 100]

Q.121 Find the number of moles of sodium hydroxide which would exactly neutralise all the acids produced by complete hydrolysis of one mole of SO_2Cl_2 . Assume 100% efficiency of all the reactions involved.

Q.122 How many number of species give white turbidity with H_2S ?

KMnO_4/H^+ , $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}^+$, KIO_3/H^+ , FeCl_3 , Br_2 -water, conc. HNO_3 , conc. H_2SO_4 , H_2O_2

Q.123 For reaction:



Find out value of expression $P - Q$.

where; P = Number of lone pairs in a molecule of 'X',

Q = Number of covalent bond(s) in a molecule of X.

Q.124 Which of the following species are pseudohalides ?

CN^- , SCN^- , OCN^- , acac, SO_3^{2-} , $\text{S}_2\text{O}_3^{2-}$, en, NC^- , TeCN^- , N_3^- , CO_3^{2-}

Q.125 How many total number of following order are correct according to their given property -

$\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3 > \text{BI}_3$	→ Order of Polarity
$\text{BF}_3 > \text{BCl}_3 > \text{BBr}_3 > \text{BI}_3$	→ Order of Bond angle
$\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3 < \text{BI}_3$	→ Order of M–X bond length
$\text{F}^- > \text{Cl}^-$	→ Order of Lewis base character
$\text{F}^- > \text{Cl}^-$	→ Order of Ionisation potential
$\text{F}^- < \text{Cl}^-$	→ Order of Stability
$\text{Cl} > \text{F}$	→ Order of Electron affinity
$\text{Cl}_2 > \text{F}_2$	→ Order of Bond Energy
$\text{HOF} > \text{HOCl}$	→ Order of Acidic character
$\text{HF} > \text{HCl}$	→ Order of Acidic character

Q.126 Iodine dissolves in cyclohexane to give a violet solution when benzene, dioxan or pyridine are added to this solution, its color changes & the apparent dipole moment of this iodine in solution increases. The moments of dipolar species formed in presence of above 3 solvents are 1.8, 3 & 4.5 D respectively with the cyclohexane solution as reference zero. Explain.

[ANSWER KEY]**EXERCISE-1**

Q.1	B	Q.2	D	Q.3	C	Q.4	C	Q.5	D
Q.6	D	Q.7	C	Q.8	D	Q.9	C	Q.10	D
Q.11	D	Q.12	A	Q.13	D	Q.14	B	Q.15	A
Q.16	C	Q.17	D	Q.18	C	Q.19	B	Q.20	A
Q.21	A	Q.22	C	Q.23	C	Q.24	D	Q.25	B
Q.26	D	Q.27	C	Q.28	D	Q.29	A	Q.30	D
Q.31	C	Q.32	A	Q.33	A	Q.34	A	Q.35	D
Q.36	C	Q.37	C	Q.38	D	Q.39	A	Q.40	B
Q.41	D	Q.42	A	Q.43	C	Q.44	C	Q.45	C
Q.46	A	Q.47	B	Q.48	A	Q.49	A	Q.50	C
Q.51	D	Q.52	C	Q.53	A	Q.54	D	Q.55	C
Q.56	C	Q.57	D	Q.58	B	Q.59	C	Q.60	D
Q.61	C	Q.62	C	Q.63	D	Q.64	B	Q.65	C
Q.66	D	Q.67	C	Q.68	C	Q.69	A	Q.70	D
Q.71	A	Q.72	B	Q.73	B	Q.74	A	Q.75	A
Q.76	B	Q.77	B	Q.78	B	Q.79	C	Q.80	B
Q.81	A	Q.82	D	Q.83	A	Q.84	A	Q.85	A
Q.86	A	Q.87	C	Q.88	C	Q.89	D	Q.90	D
Q.91	B	Q.92	A	Q.93	C	Q.94	B	Q.95	C
Q.96	B	Q.97	A	Q.98	B	Q.99	A	Q.100	A
Q.101	B	Q.102	C	Q.103	B	Q.104	B	Q.105	D
Q.106	A	Q.107	C	Q.108	A	Q.109	A	Q.110	D
Q.111	D	Q.112	D	Q.113	C	Q.114	D	Q.115	D
Q.116	D	Q.117	D	Q.118	D	Q.119	B	Q.120	A
Q.121	D	Q.122	B	Q.123	C	Q.124	D	Q.125	D
Q.126	A	Q.127	B	Q.128	D	Q.129	A	Q.130	C
Q.131	B	Q.132	A	Q.133	B	Q.134	C	Q.135	B
Q.136	A	Q.137	A	Q.138	B	Q.139	B	Q.140	D
Q.141	B	Q.142	A	Q.143	A	Q.144	C	Q.145	C
Q.146	B	Q.147	D	Q.148	C	Q.149	A	Q.150	B
Q.151	C	Q.152	D	Q.153	A	Q.154	B	Q.155	A
Q.156	B	Q.157	D	Q.158	D	Q.159	C	Q.160	C
Q.161	C	Q.162	C	Q.163	B	Q.164	D	Q.165	B
Q.166	D	Q.167	A	Q.168	D	Q.169	A	Q.170	B

Q.171 D	Q.172 D	Q.173 B	Q.174 B	Q.175 C
Q.176 D	Q.177 C	Q.178 D	Q.179 C	Q.180 C
Q.181 C	Q.182 D	Q.183 D	Q.184 D	Q.185 C
Q.186 A	Q.187 B	Q.188 B	Q.189 A	Q.190 D
Q.191 B	Q.192 D	Q.193 C	Q.194 A	Q.195 C
Q.196 B	Q.197 A	Q.198 C	Q.199 A	Q.200 C
Q.201 C	Q.202 A	Q.203 C	Q.204 B	Q.205 C
Q.206 A	Q.207 D	Q.208 C	Q.209 C	Q.210 D
Q.211 A,D	Q.212 D	Q.213 D	Q.214 B	Q.215 A
Q.216 A	Q.217 D	Q.218 B	Q.219 D	Q.220 B
Q.221 D	Q.222 B	Q.223 A	Q.224 A	Q.225 B
Q.226 C	Q.227 D	Q.228 A	Q.229 C	Q.230 C
Q.231 C	Q.232 C	Q.233 C	Q.234 A	Q.235 C
Q.236 A	Q.237 A	Q.238 C	Q.239 B	Q.240 B
Q.241 D	Q.242 A	Q.243 D	Q.244 A	Q.245 D
Q.246 B	Q.247 B	Q.248 D	Q.249 A	Q.250 B
Q.251 B	Q.252 B	Q.253 D	Q.254 C	Q.255 D
Q.256 D	Q.257 D	Q.258 B	Q.259 C	Q.260 B
Q.261 C	Q.262 A			

EXERCISE-2

- | | | | | |
|---|------------|---|------------|------------|
| Q.1 ABCD | Q.2 ABCD | Q.3 ABC | Q.4 ABC | Q.5 ABC |
| Q.6 BC | Q.7 ABC | Q.8 ABCD | Q.9 ACD | Q.10 BCD |
| Q.11 ACD | Q.12 ABD | Q.13 ACD | Q.14 ABC | Q.15 ABCD |
| Q.16 BC | Q.17 AC | Q.18 BCD | Q.19 ABD | Q.20 ABD |
| Q.21 ABD | Q.22 ABC | Q.23 BCD | Q.24 ACD | Q.25 BCD |
| Q.26 BCD | Q.27 BCD | Q.28 BD | Q.29 ABC | Q.30 BCD |
| Q.31 BCD | Q.32 AB | Q.33 ABCD | Q.34 ABCD | Q.35 AC |
| Q.36 B | Q.37 BCD | Q.38 AB | Q.39 BCD | Q.40 AC |
| Q.41 AC | Q.42 ABC | Q.43 ACD | Q.44 B | Q.45 ABC |
| Q.46 ACD | Q.47 BCD | Q.48 AB | Q.49 ABD | Q.50 ABC |
| Q.51 ABCD | Q.52 ABD | Q.53 ABCD | Q.54 ABCD | Q.55 ABCD |
| Q.56 ABCD | Q.57 A | Q.58 A | Q.59 B | Q.60 D |
| Q.61 A | Q.62 B | Q.63 A | Q.64 B | Q.65 C |
| Q.66 B | Q.67 A | Q.68 B | Q.69 C | Q.70 C |
| Q.71 C | Q.72 B | Q.73 A | Q.74 A | Q.75 D |
| Q.76 A | Q.77 D | Q.78 B | Q.79 D | Q.80 B |
| Q.81 A | Q.82 A | Q.83 B | Q.84 C | Q.85 A |
| Q.86 D | Q.87 D | Q.88 B | Q.89 ABC | Q.90 ACD |
| Q.91 ABCD | Q.92 C | Q.93 D | Q.94 C | Q.95 A |
| Q.96 A | | | | |
| Q.97 (P) 4 ; (Q) 2; (R) 3; (S) 1 | | Q.98 (A) s (B) r (C) p (D) q | | |
| Q.99 (A) q (B) p (C) r, s (D) q | | Q.100 (A) PQRS (B) PRS (C) PRST (D) PRS | | |
| Q.101 (A) P, (B) RS, (C) QRS | | Q.102 (A) PS (B) QS (C) QST (D) RS | | |
| Q.103 I-b, II-c, III-a, IV-d | | Q.104 6 | | Q.105 0003 |
| Q.106 0034 | Q.107 3.33 | Q.108 2 | Q.109 3 | Q.110 2 |
| Q.111 4 | Q.112 0006 | Q.113 3 | Q.114 0004 | |
| Q.115 In NOCl, NO group bonded by a covalent bond which reflects its boiling point and in NO[BrF ₄] it is in the form of NO ⁺ ion which reflects its melting point and conductivity. | | | | |
| Q.116 0005 | Q.117 0006 | Q.118 3018 | Q.119 1.33 | Q.120 250 |
| Q.121 4 | Q.122 8 | Q.123 5 | Q.124 6 | Q.125 6 |
| Q.126 Donar strength increases in the order benzene < dioxan < py. Greater interaction implies greater electron transfer and hence a higher dipole moment | | | | |