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CBSE 12th Chemistry
Chapter- 7 (The p-Block Elements)
Unsolved Important Questions

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SECTION A

(Each question in this section carry 1 mark)

Q.1. In which one of the two structures, $NO^{+}{}_{2}$ and $NO^{-}{}_{2}$, the bond angle has a higher value?

Q2. What is the structure of XeF_2 molecule, Draw it?

Q.3. Which one of PCl_4^+ is not likely and why?

Q.4. What is the basicity of H_3PO_4?

Q.5. Which is a stronger reducing agent, SbH_3 of BiH_3, and why?

Q.6. Why is the bond angle in PH_3 molecule lesser then that

Q.7. Why is red phosphorus less reactive than while phosphorus?

Q.8. Which is a stronger reducing agent, SbH_3 of BiH_3, and why?

Q.9. Name two poisonous gases which can be prepared from chlorine gas.

Q.10. What is the basicity of H_3PO_3?

Q.11. Write the formula of any two oxoacids of Sulphur.

Q.12. Write the structures of the following:
(i) BrF_3
(ii) XeF_4

Q.13. Write the formula of the compound of phosphorus which is obtained when conc. HNO_3 oxidises P_4.

Q.14. Fluorine does not exhibit any positive oxidation state. Why?

SECTION B

(Each question in this section carry 2 marks)

Q.15. What happen when:
(i) SO_2 gas is passed through an aqueous solution Fe^{3+} salt.
(ii) XeF_4 reacts with SbF_5.

Q.16. Draw the structural formulae of the following compounds:
(i) $H_4P_2O_5$
(ii) XeF_4

Q.17. Assign a reason for each of the following statements.

(i) Ammonia is a stronger base than phosphine.
(ii) Sulphur in vapour state exhibits a paramagnetic behavior.

Q.18. Explain the following giving higher oxidation reason in each case.

(i) O_2 and F_2 both stabilize higher oxidation states of metals but O_2 exceeds F_2 in doing so.
(ii) structure of Xenon fluorides cannot be explained by Valence Bond Approach.

Q.19. Complete the following chemical reaction equations.

(i) $XeF_2 + H_2O \longrightarrow$

(ii) $PH_3 + HgCl_2 \longrightarrow$

Q.20. Draw the structures of the following molecules:

(i) SF_4 (ii) XeF_4

Q.21. Draw the structures of white phosphorus and red phosphorus. Which one of these two types of phosphorus is more reactive and why?

Q.22. Give reason for:

(i) SF_6 is kinetically an inert substance.
(ii) The $N-O$ bond in NO_2^- is shorter than the $N-O$ bond in NO_3^-.

Q.23. State reasons for each of the following:

(i) All the $P-Cl$ bonds in PCl_5 molecule are not equivalent.
(ii) Sulphur has greater tendency for catenation than oxygen.

Q.24. What happens when.
(i) PCl_5 is heated
(ii) H_3PO_3 is heated? Write the reactions involved.

Q.25. Complete the following chemical equations:

(i) $Ca_3P_2 + H_2O \longrightarrow$

(ii) $Cu + H_2SO_4\ (conc.) \longrightarrow$

Q.26. Arrange the following in the order of property indicated against each set:

(i) HF, HCL, HBr, HI – increasing bond dissociation enthalpy.

(ii) H_2O, H_2S, H_2Se, H_2Te – Increasing acidic character.

Q.27. Complete the following reactions:
(i) $NH_3 + 3Cl_2(excess) \rightarrow$
(ii) $XeF_6 + 2H_2O \rightarrow$

Q.28. What happens when
(i) $(NH_4)_2Cr_2O_7$ is heated?
(ii) H_3PO_3 is heated?
Write the equations.

Q.29. Draw the structures of the following:
(i) $H_2S_2O_7$

(ii) XeF_6

Q.30. Complete the following equation:

(i) $P_4 + H_2O + NaOH \longrightarrow$

(ii) $XeF_4 + O_2F_2 \longrightarrow$

Q.31. Draw the structures of the following molecules:

(i) $XeOF_4$ **(ii)** H_3PO_3 **.**

Q.32. Draw the structure of the following:

(i) XeF_2

(ii) BrF_3

Q.33. Give reasons:

(i) SO_2 **is reducing while** TeO_2 **is an oxidizing agent.**

(ii) Nitrogen does not form pentahalide.

(iii) ICl **is more reactive** I_2**.**

Q.34. Draw the structures of the following:

(a) H_2SO_3

(b) $HClO_3$

Q.35. Explain the following facts giving appropriate reason in each case:

(i) NF_3 **is an exothermic compound whereas** NCl_3 **is not.**

(ii) All the bonds in SF_4 **are not equivalent**

SECTION C

(Each question in this section carry 3 marks)

Q.36. Arrange the following in order of property indicated for each set.

(i) F_2, Cl_2, Br_2, I_2 incresing bond dissociation enthalpy.
(ii) HF, HCL, HBr, HI increasing acid strength.
(iii) NH_3,$PH_3, ASH_3, SbH_3, BiH_3$ Increasing base strength.

Q.37. Explain the following:
(a) The electron gain enthalpy with negative sign for fluorine is less than that for chlorine, still fluorine is a strong oxidizing agent than chlorine.
(b) XeF_2 is linear molecule without a bend.
(c) NCl_3 is an endothermic compound while NF_3 is an exothermic one.

Q.38. Account for the following:

(i) NH_3 is a stronger base than PH_3

(ii) Sulphur has a greater tendency for catenation than oxygen.

(iii) Bond dissociation energy of F_2 is less than that of Cl_2.

Q.39 Explain the following situations:

(i) In the structure of HNO_3 molecule, the N-O bond (121 pm) is shorter than N-OH bond (140 pm).
(ii) SF_4 is easily hydrolyzed whereas SF_6 is not easily hydrolyzed.
(iii) XeF_2 has a straight linear structure and not a bent angular structure.

Q.40. (a) Draw the structure of the following molecules:
(i) $XeOF_4$
(ii) H_2SO_4

(b) Write the structural difference between white phosphorus and red phosphorus.

Q.41. Account for the following:

(i) PCl_5 is more covalent then PCl_3.
(ii) Iron on reaction with HCl Forms $FeCl_2$and not $FeCl_3$.
(iii) The two O-O bond lengths in the ozone molecule are equal.

Q.42. How would your account for the following?

(i) H_2S **is more acidic than** H_2O

(ii) The N - O bond in NO_2^- **is shorter than the N - O bond in** NO_3^- **.**

(iii) Both O2and F2stabilize high oxidation states but the ability of oxygen to stabilize the higher oxidation state exceeds that of fluorine.

Q.43. Give reasons for the following:

(i) Where R is an alkyl group, $R_3P = 0$ **exists but** $R_3N = O$ **does not**

(ii) $PbCl_4$ **is more covalent than** $PbCl_2$

(iii) At room temperature, N_2 **is much less reactive.**

Q.44. Give reasons for the following:

(i) $(CH_3)_3\,P = O$ ***exists but*** $(CH_3)_3\,N = O$ ***does not***.

(ii) Oxygen has less electron gain enthalpy with negative sign than Sulphur.

(iii) H_3PO_2 ***is a stronger reducing agent than*** H_3PO_3.

Q.45. Give reasons for the following:

(a) Red phosphorus is less reactive than white phosphorus.

(b) Electron gain enthalpies of halogens are largely negative.

(c) N_2O_5 **is more acidic than** N_2O_3**.**

Q.46. Give reasons:

(i) Thermal stability decreases from H_2O **to** H_2Te**.**

(ii) Fluoride ion has higher hydration enthalpy than chloride ion.

(iii) Nitrogen does not form pentahalide.

SECTION D

(Each question in this section carry 5 marks)

Q.47. (a) Complete the following chemical equations:

(i) $NaOH_{(aq)} + Cl_{2(g)} \longrightarrow$

(Hot and conc.)

(ii) $XeF_6(s) + H_2O(l) \longrightarrow$

(b) How would you account for the following?

(i) The value of election gain enthalpy with negative sign for Sulphur is higher than that for oxygen.

(ii) NF_3 **is an exothermic compound but** NCl_3**is endothermic compound.**

(iii) ClF_3 **moleule has a T − shaped structure and not a trigonal planar one.**

Q.48. (a) Complete the following chemical reaction equations:

(i) $P_4 + SO_2Cl_2 \longrightarrow$

(ii) $XeF_4 + H_2O \longrightarrow$

(b) Explain the following observations giving appropriate reasons:

(i) The stability of + 5 oxidation state decreases down the group in group 15 of the periodic table.

(ii) Solid phosphorus pentachloride behaves as an ionic compound.

(iii) Halogens are strong oxidizing agents.

Q.49. (a) Explain the following:

(i) NF_3 **is an exothermic compound whereas** NCl_3 **is not.**

(ii) F_2 **is most reactive of all the four common halogens.**

(b) Complete the following chemical equation:

(i) $C + H_2SO_4(conc) \longrightarrow$

(ii) $P_4 + NaOH + H_2O \longrightarrow$

(iii) $Cl_2 + F_2 \longrightarrow$

(excess)

Q.50. (a) Account for the following:

(i) The acidic strength decreases in the order $HCl > H_2S > PH_3$

(ii) Tendency to form pentahalides decreases down the group in group 15 of the periodic table.

(b) Complete the following chemical equation:

(i) $P_4 + SO_2Cl_2 \longrightarrow$

(ii) $XeF_2 + H_2O \longrightarrow$

(iii) $I_2 + HNO_3 \longrightarrow$

(conc)

Q.51. (a) Complete the following chemical reaction equations:

(i) $P_4 + SO_2\,Cl_2 \longrightarrow$

(ii) $XeF_6 + H_2O \longrightarrow$

(b) Predict the shape and the asked angle $(90^0\ or\ more\ or\ less)$ **in each of the following cases:**

(i) SO_3^{2-} *and the angle* O**–S-O**

(ii) ClF_3 **and the angle** $F - Cl - F$

(iii) XeF_2 **and the angle** $F - Xe - F$

Q.52. (a) Complete the following chemical equations:

(i) $NaOH + Cl_2 \longrightarrow (hot\ and\ cone.)$

(ii) $XeF_4 + O_2F_2 \longrightarrow$

(b) Draw the structures of the following molecules:

(i) H_3PO_2

(ii) $H_2S_2O_7$

(iii) $XeOF_4$

Q.53. (a) Give reasons for the following:

(i) Bond enthalpy of F_2 **lower than that of** Cl_2
(ii) PH_3 **has lower boiling point than** NH_3**.**

(b) Draw the structures of the following molecules:

(i) BrF_3
(ii) $(HPO_3)_3$
(iii) XeF_4

Q.54. (a) Account for the following:

(i) Helium is used in diving apparatus.
(ii) Fluorine does not exhibit positive oxidation state.
(iii) Oxygen shows catenation behavior less than Sulphur.

(b) Draw the structure of the following molecules.

(i) XeF_2
(ii) $H_2S_2O_8$

Q.55. (a) Account for the following:

(i) Acidic character increases from HF to HI.

(ii) There is large difference between the melting and boiling points of oxygen and Sulphur.

(iii) Nitrogen does not form pentahalide.

(b) Draw the structure of the following:

(i) ClF_3, (ii) XeF_4

Q.56. (i) Which allotrope of phosphorus is more reactive and why?

(ii) How the supersonic jet areophane are responsible for the depletion of ozone layers?

(iii) F_2 has lower bond dissociation anthalpy than Cl_2 why?

(iv) Which noble gas Is used in filling balloons for meteorological observations?

(v) Complete the equation:

$XeF_2 + PF_5 \longrightarrow$

Q.57. (a) Draw the molecular structures of the following compounds:

(i)N_2O_5 (ii) $XeOF_4$

(b) Explain the following observations:

(i) Sulphur has a greater tendency for catenation then oxygen.

(ii) ICI is more reactive thanI_2.

(iii) Despite lower value of its electron gain enthalpy with negative sing, fluorine (F_2) is a stronger oxidising agent than Cl_2

Q.58. (a) Complete the following chemical equations:

(i) Cu + HNO_3 (dilute) $\longrightarrow$

(ii) XeF_4 _ $O_2F_2 \longrightarrow$

(b) Explain the following observations:

(i) Phosphorus has greater tendency for catenation than nitrogen.

(ii) Oxygen is a gas but Sulphur a solid.

(iii) The halogens are colored. Why?

Q.59. Assign reasons for the following:

(i) Sulphur vapour is paramagnetic.

(ii) Ammonia (NH3) has greater affinity for protons than phosphine (PH_3).

(iii) The negative value of electron gain enthalpy of fluorine is less than that of chlorine.

(iv) SF_6 is much less reactive than SF_4.

(v) Of the noble gases only xenon is known to form well-established chemical compounds.

Q.60. (a) Describe the favorable conditions for the manufacture of
(i) ammonia by Haber's process
(ii) sulphuric acid by contact process.

(b) Draw the structures of the following:

(i) PCl_5(g)
(ii) S_8(g)
(iii) CIF_3 (g)

Q.61. (a) Draw the structure of the following:

(i) $H_2S_2O_8$
(ii) $HClO_4$

(b) How would you account for the following:

(i) NH_3 is a stronger base than PH_3
(ii) Sulphur has a greater tendency for catenations than oxygen.
(iii) F_2 is a stronger oxidizing agent than Cl_2.

Q.62. (a) Draw the structures of the following:

(i) $H_2S_2O_7$
(ii) $HClO_3$

(b) Explain the following observations:
(i) In the structure of HNO_3, the N-O bond
(121 pm) is shorter than the $N-OH$ Bond (140 pm).
(ii) All the $P-Cl$ bonds in PCl_5 $are\ not\ equivalent$.
(iii) ICI is more reactive than I_2.

Q.63. (a) Complete the following chemical equations:

(i)$HgCl_2 + PH_3 \longrightarrow$
(ii)$SO_3 + H_2SO_4 \longrightarrow$
(iii)$XeF_4 + H_2O \longrightarrow$

(b) Draw the structure of

(i)$(HPO_3)_3$
(ii)BrF_3

Q.64. (a) What happens when

(i) Chlorine gas is passed through a hot connect rated solution of NaOH?
(ii) Sulphur dioxide gas is passed through an aqueous solution of a Fe (III)salt?

(b) Answer the following:
(i) Why is the basicity of H_3PO_3 and why?
(ii) Why does fluorine not play the role of a central atom in interhalogen compounds?
(iii) Why do noble gases have low boiling points?

Q.65. (a) Draw the molecular structures of the following compounds:
(i)N_2O_5 (ii) $XeOF_4$

(b) Explain the following observations:
(i) Sulphur has a greater tendency for catenation then oxygen.
(ii) ICI is more reactive thanI_2.
(iii) Despite lower value of its electron gain enthalpy with negative sing, fluorine (F_2) is a stronger oxidising agent than Cl_2

Q.66. (a)Complete the following chemical equations:
(i) $Cu + HNO_3$ (dilute) $\longrightarrow$
(ii) $XeF_4 \_ O_2F_2 \longrightarrow$

(b) Explain the following observations:
(i) Phosphorus has greater tendency for catenation than nitrogen.
(ii) Oxygen is a gas but Sulphur a solid.
(iii) The halogens are colored. Why?

Q.67. (a) Account for the following:

(i) Acidic character increases from HF to HI.
(ii) There is large difference between the melting and boiling points of oxygen and Sulphur.
(iii) Nitrogen does not form pentahalide.

(b) Draw the structure of the following:

(i) ClF_3, $(ii)XeF_4$

Q.68. (i) Which allotrope of phosphorus is more reactive and why?

(ii) How the supersonic jet airplane is responsible for the depletion of ozone layers?

(iii) F_2 has lower bond dissociation anthalpy than Cl_2 why?

(iv) Which noble gas Is used in filling balloons for meteorological observations?

(v) Complete the equation: $XeF_2 + PF_5 \longrightarrow$

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