Assignment No – 1 P – Block Elements

Que 1. Arrange the following in order of increasing acidity H_3PO_4, H_2CO_3, HCl, HI

(a) H_3PO_4, HCl, H_2CO_3, HI (b) H_3PO_4, H_2CO_3, HCl, HI (c) H_2CO_3, H_3PO_4, HCl, HI (d) None of these

Que 2. Which of the following oxides is the most acidic?

(a) N_2O_5 (b) P_2O_5 (c) As_2O_5 (d) Sb_2O_5

Que 3. On heating $KClO_3$, we get

(a) $KClO_2 + O_2$ (b) $KCl + O_2$ (c) $KCl + O_3$ (d) $KCl + O_2 + O$

Que 4. Which one is not a property of ozone?

(a) it acts an oxidising agent in dry state (b) oxidation of KI into KIO_2

(c) PbS is oxidised to $PbSO_4$ (d) Hg is oxidised to Hg_2O

Que 5. The number of P – O – P bonds in cyclic metaphosphoric acid is –

(a) zero (b) two (c) three (d) four

Que 6. Molecular shapes of SF_4, CF_4 and XeF_4 are –

(a) The same with 2, 0 and 1 lone pairs of electrons respectively

(b) The same with 1, 1 and 1 lone pairs of electrons respectively

(c) Different with 0, 1 and 2 lone pairs of electrons respectively

(d) Different with 1, 0 and 2 lone pairs of electrons respectively.

Que 7. The correct order of acidic strength is –

(a) $Cl_2O_7 > SO_2 > P_4O_{10}$ (b) $CO_2 > N_2O_5 > SO_3$ (c) $Na_2O > MgO > Al_2O_3$ (d) $K_2O > CaO > MgO$

Que 8. The correct order of increasing electron affinity of halogens is:

(a) I < Br < Cl (b) Br < I < Cl (c) Cl < Br < I (d) I < Cl < Br

Que 9. Which of the following is planar?

(a) XeO_4 (b) XeO_3F (c) XeO_2F_2 (d) XeF_4

Que 10. Which one of the following molecules will form a linear polymeric structure due to hydrogen bonding?

(a) HCl (b) HF (c) H_2O (d) NH_3

Que 11. The number of S – S bonds in sulphur trioxide trimer (S_3O_9) is –

(a) three (b) Two (c) one (d) zero

Que 12. Which of the following statements are correct?

(a) Among halogens, radius ratio between iodine and fluorine is maximum

(b) Leaving F–F bond, all halogens have weaker X—X bond than X—X' bond in interhalogens (c) Among interhalogen compounds maximum number of atoms are present in iodine fluoride.

(d) Interhalogen compounds are more reactive than halogen compounds

Que 13. The number of σ - bonds in P_4O_{10} is –

(a) 6 (b) 16 (c) 20 (d) 7

Que 14. In NO_3^- ion, the number of bonds pairs and lone pair of electrons of nitrogen atom are –

(a) 2, 2 (b) 3, 1 (c) 1, 3 (d) 4, 0

Que 15. Which of the following has pπ - dπ bonding?

(a) NO_3^- (b) SO_3^{2-} (c) BO_3^{-3} (d) CO_3^{-2}

Que 16. Number of lone pairs of electrons on Xe atoms in XeF_2, XeF_4 and XeF_6 molecules are respectively –

(a) 3, 2 and 1 (b) 4, 3 and 2 (c) 2, 3 and 1 (d) 3, 2 and 0

Que 17. Which of the following statements are correct for SO_2 gas?

(a) It acts as bleaching agent in moist conditions (b) Its molecule has linear geometry

(c) Its dilute solution is used as disinfectant. (d) It can be prepared by the reaction of dilute H_2SO_4 with metal sulphide.

Que 18. The true statement for the acids of phosphorus, H_3PO_2, H_3PO_3 and H_3PO_4 is –

(a) The order of their acidity is $H_3PO_4 > H_3PO_3 > H_3PO_2$ (b) All of them are reducing in nature

(c) All of them are tribasic acids (d) The geometry of phosphorus is tetrahedral in all the three

Que 19. Which of the following substances has the highest proton affinity?

(a) PH_3 (b) H_2O (c) H_2S (d) NH_3

Que 20. On boiling phosphorus with KOH solution, product formed is–

(a) Potassium sulphate (b) Phosphorus pentoxide(c) Phosphorus hydroxide (d) Phosphine

Que 21. Which of the following are isoelectric and isostructural? NO_3^-, CO_3^{2-}, ClO_3^-, SO_3

(a) NO_3^-, CO_3^{2-} (b) SO_3, NO_3^- (c) CO_3^{2-}, ClO_3^- (d) CO_3^{2-}, SO_3

Que 22. Which of the following statements are true?

(a) Only type of interactions between particles of noble gases are due to weak dispersion forces. (b) Ionisation enthalpy of molecular oxygen is very close to that of Xenon.

(c) Hydrolysis of XeF_6 is a redox reaction.

(d) Xenon fluorides are not reactive.

Que 23. [A] + H_2SO_4 → [B] a colourless gas with irritating smell [B] + $K_2Cr_2O_7$ + H_2SO_4 → green solution. [A] and [B] are –

(a) SO_3^{2-}, SO_2 (b) Cl^-, HCl (c) S^{2-}, H_2S (d) CO_3^{2-}, CO_2

Que 24. For H_3PO_3 and H_3PO_4, the correct choice is –

(a) H_3PO_3 is dibasic and reducing (b) H_3PO_3 is dibasic and non-reducing

(c) H_3PO_4 is tribasic and reducing (d) H_3PO_3 is tribasic and non-reducing

Que 25. Total number of lone pairs of electrons in $XeOF_4$ is –

(a) 0 (b) 1 (c) 2 (d) 3

Que 26. The acid having O–O bond is –

(a) $H_2S_2O_3$ (b) $H_2S_2O_6$ (c) $H_2S_2O_8$ (d) $H_2S_4O_6$

Que 27. Among the following, the pair in which the two species are not isostructural is –

(a) SiF_4 and SF_4 (b) IO_3^- and XeO_3 (c) BH_4^- and NH_4^+ (d) PF_6^- and SF_6

Que 28. In BrF_3 molecule, the lone pairs occupy equatorial positions to minimise –

(a) lone pair-bond pair repulsion only (b) bond pair- bond pair repulsions only

(c) lone pair-lone pair and lone pair-bond pair repulsions (d) lone pair-lone pair repulsions only

Que 29. Which of the following is the increasing order of enthalpy of vaporization?

(a) NH_3, PH_3, AsH_3 (b) AsH_3 PH_3, NH_3 (c) NH_3, AsH_3, PH_3 (d) PH_3, AsH_3, NH_3

Que 30. Which of the following oxides of nitrogen is solid?

(a) NO_2 (b) H_2O (c) N_2O_3 (d) N_2O_5

Que 31. Among Al_2O_3, SiO_2, P_2O_3 and SO_2, the correct order of acid strength is –

(a) $SO_2 < P_2O_3 < SiO_2 < As_2O_3$ (b) $SiO_2 < SO_2 < As_2O_3 < P_2O_3$

(c) $As_2O_3 < SiO_2 < SO_2 < P_2O_3$ (d) $As_2O_3 < SiO_2 < P_2O_3 < SO_2$

Que 32. Match the items of column 1 and column 2 and mark the correct option.

Column 1 **Column 2**

(A) Its partial hydrolysis does not — (1) He change oxidation state of central atom

(B) It is used in modern diving apparatus — (2) XeF_6

(C) It is used to provide inert atmosphere — (3) XeF_4 for filling electrical bulbs

(D) Its central atom is in sp^3d^2 hybridisation — (4) Ar

(a) A–1, B–4, C–2, D–3 (b) A–1, B–2, C–3, D–4

(c) A–2, B–1, C–4, D–3 (d) A–1, B–3, C–2, D–4

Que 33. Which among the following factors is most important in making fluorine the strongest oxidizing agent?

(a) electron affinity (b) ionization energy (c) hydration energy (d) bond dissociation energy

Que 34. Which one of the following oxides is expected to exhibit paramagnetic behaviour?

(a) CO_2 (b) ClO_2 (c) SO_2 (d) SiO_2

Que 35. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species?

(a) F < Cl < O < S (b) S < O < Cl < F (c) O < S < F < Cl (d) Cl < F < S < O

Que 36. The number of hydrogen atoms attached to phosphorus atom in hypophosphorus acid is –

(a) zero (b) two (c) one (d) three

Que 37. Which of the following isomers of phosphorus is thermodynamically most stable?

(a) Red (b) White (c) Black (d) Yellow

Que 38. Which of the following contains maximum number of lone pairs of electrons on the central atom?

(a) ClO_3^- (b) XeF_4 (c) SF_4 (d) I_3^-

Que 39. Among the following molecules

(i) XeO_3 (ii) $XeOF_4$ (iii) XeF_6

those having same number of lone pairs on Xe are –

(a) (i) and (ii) only (b) (i) and (iii) only (c) (ii) and (iii) only (d) (i), (ii) and (iii)

Que 40. The number of P – O – P bonds in the structure of phosphorus pentoxide and phosphorus trioxide are respectively –

(a) 6, 6 (b) 5, 5 (c) 5, 6 (d) 6, 5

Que 41. There are no S – S bond in –

(a) $S_2O_4^{2-}$ (b) $S_2O_5^{2-}$ (c) $S_2O_3^{2-}$ (d) $S_2O_7^{2-}$

Que 42. In which of the following molecules/ ions are all the bonds not equal?

(a) SF_4 (b) SiF_4 (c) XeF_4 (d) BF_4^-

Que 43. Which products are expected from the disproportionation reaction of hypochlorous acid?

(a) $HClO_3$ and Cl_2O (b) $HClO_2$ and $HClO_4$ (c) HCl and Cl_2O (d) HCl and $HClO_3$

Que 44. The decreasing values of bond angles for NH_3 (106) to SbH_3 (101^0) down group 15 of the periodic table is due to –

(a) Increasing bond pair-bond pair repulsion (b) Increasing p-orbital character in sp^3

(c) Decreasing bond pair-bond pair repulsion (d) Decreasing electronegativity

Que 45. Which of the following statements is true?

(a) H_3PO_3 is a stronger acid than H_2SO_3 (b) In aqueous medium, HF is a stronger acid than HCl

(c) $HClO_4$ is a weaker acid than $HClO_3$ (d) HNO_3 acid is a stronger acid than HNO_2

Que 46. Which of the following chemical reactions depicts the oxidizing behaviour of H_2SO_4?

(a) $2\ HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2\ H_2O$ (b) $Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + 2\ H_2O$

(c) $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$ (d) $2\ PCl_5 + H_2SO_4 \rightarrow 2\ POCl_3 + 2\ HCl$

Assertion and Reason Type Note:

In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choice.

(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.

(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.

(c) Assertion is correct, but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Both assertion and reason are wrong statements.

Que 47. Assertion: Hl cannot be prepared by the reaction of Kl with concentrated H_2SO_4.

Reason: Hl has lowest H—X bond strength among halogen acids.

Que 48. Assertion: Both rhombic and monoclinic sulphur exist as S_8 but oxygen exist as O_2.

Reason: Oxygen forms pл – pл multiple bond due to

Que 49. Which is the strongest acid?

(a) H_2SO_4 (b) HCl (c) $HClO_4$ (d) HNO_3

Que 50. Which of the following oxides of nitrogen is thermally most stable?

(a) N_2O_5 (b) N_2O (c) NO (d) N_2O_3

Que 51. Which inert gas has abnormal behaviour on liquefaction?

(a) Xe (b) He (c) Ar (d) Kr

Que 52. The bleaching action of $CaOCl_2$ is due to –

(a) nascent oxygen (b) chlorine (c) HClO (d) HCl

Que 53. Nitrogen forms a variety of compounds in all oxidation states ranging from –

(a) – 3 to + 5 (b) – 3 to + 3 (c) – 3 to + 4 (d) – 3 to + 6

Que 54. High concentration of fluoride are poisonous and harmful to bones and teeth at levels over –

(a) 1 ppm (b) 3 ppm (c) 5 ppm (d) 10 ppm

Que 55. The compound which has molecular nature in gas phase but ionic in solid state is –

(a) PCl_5 (b) CCl_4 (c) PCl_3 (d) $POCl_3$

Que 56. Which of the following is the most basic oxide?

(a) SeO_2 (b) Al_2O_3 (c) Sb_2O_3 (d) Bi_2O_3

Que 57. Which of the following orders is not in accordance with the property stated against it?

(a) $F_2 > Cl_2 > Br_2 > I_2$; bond dissociation energy (b) $F_2 > Cl_2 > Br_2 > I_2$; oxidizing power

(c) HI > HBr > HCl > HF; acidic property power (d) $F_2 > Cl_2 > Br_2 > I_2$; electronegativity

Que 58. In which of the following molecules, are all the bonds not equal?

(a) NF_3 (b) ClF_3 (c) BF_3 (d) AlF_3

Que 59. In which of the following pairs, the two species are isostructural?

(a) BrO_3^- and XeO_3 (b) SF_4 and XeF_4 (c) SO_3^{2-} and NO_3^- (d) BF_3 and NF_3^-

Que 60. Which of the following increasing order is not correct as mentioned in the property with it?

(a) $HClO < HClO_2 < HClO_3 < HClO_4$ (thermal stability) (b) $HClO_4 < HClO_3 < HClO_2 < HClO$ (oxidising power)

(c) $F^- < Cl^- < Br^- < 1^-$ (reducing nature) (d) $HlO_4 < lCl < l_2 < Hl$ (oxidation number of iodine)