21 The p-Block Elements (Group 15, 16, 17 & 18)

Conceptual MCQs

1. Sodium thiosulphate is a :
(a) reducing agent
(b) oxidising agent
(c) complexing agent
(d) bleaching agent

2. Which of the following is incorrect for white and red phosphorus ?
(a) They are both soluble in CS_2
(b) They can be oxidised by heating in air
(c) They consist of the same kind of atoms
(d) They can be converted into one another

3. The number of P – O – P bonds in cyclic metaphosphoric acid is:
(a) zero (b) two
(c) three (d) four

4. Which one has the lowest boiling point ?
(a) NH_3 (b) PH_3
(c) AsH_3 (d) SbH_3

5. Which of the following has maximum bond energy?
(a) Cl_2 (b) F_2
(c) Br_2 (d) I_2

6. Nitrogen is relatively inactive element because
(a) its atom has a stable electronic configuration.
(b) it has low atomic radius.
(c) its electronegativity is fairly high.
(d) dissociation energy of its molecule is fairly high.

7. A gas that cannot be collected over water is :
(a) N_2 (b) O_2
(c) SO_2 (d) PH_3

8. H_3PO_2 is the molecular formula of an acid of phosphorus. Its name and basicity respectively are :
(a) phosphorus acid and two
(b) hypophosphorous acid and two
(c) hypophosphorous acid and one
(d) hypophosphoric acid and two

9. The formation of $O_2^+[PtF_6]^-$ is the basis for the formation of xenon fluorides. This is because
(a) O_2 and Xe have comparable sizes.
(b) both O_2 and Xe are gases.
(c) O_2 and Xe have comparable ionisation energies.
(d) Both (a) and (c)

10. Which of the following has the highest $p\pi - p\pi$ bonding tendency ?
(a) N (b) P
(c) As (d) Sb

11. Total number of lone pair of electrons in $XeOF_4$ is :
(a) 0 (b) 1
(c) 2 (d) 3

12. How many bonding electron pairs are there in white phosphorus ?
(a) 2 (b) 4
(c) 3 (d) 5

13. Which of the following is not oxidized by O_3 ?
(a) KI
(b) $FeSO_4$
(c) $KMnO_4$
(d) K_2MnO_4

14. The acid which has a peroxy linkage is :
(a) sulphurous acid
(b) pyrosulphuric acid
(c) dithionic acid
(d) caro's acid

15. The bleaching action of chlorine is due to :
(a) reduction
(b) hydrogenation
(c) chlorination
(d) oxidation

Application Based MCQs

16. When orthophosphoric acid is heated to 600°C, the product formed is :
(a) PH_3 (b) P_2O_5 (c) H_3PO_3 (d) HPO_3

17. Ammonia on reaction with hypochlorite anion can form :
(a) NO
(b) N_2H_4
(c) NH_4Cl
(d) Both (b) and (c)

18. P_2O_5 is heated with water to give :
(a) hypophosphorous acid
(b) phosphorous acid
(c) hypophosphoric acid
(d) orthophosphoric acid

19. $NH_4ClO_4 + HNO_3(dil.) \longrightarrow HClO_4 + [X]$

$[X] \xrightarrow{\Delta} Y(g)$

[X] and [Y] are respectively –
(a) NH_4NO_3 & N_2O
(b) NH_4NO_2 & N_2
(c) HNO_4 & O_2
(d) None of these

20. Basicity of orthophosphoric acid is :
(a) 2 (b) 3 (c) 4 (d) 5

21. Oxidation of thiosulphate by iodine gives :
(a) tetrathionate ion
(b) sulphide ion
(c) sulphate ion
(d) sulphite ion

22. PCl_3 reacts with water to form :
(a) PH_3
(b) H_3PO_4 and HCl
(c) $POCl_3$
(d) H_3PO_4

23. When PbO_2 reacts with conc. HNO_3 the gas evolved is :
(a) NO_2 (b) O_2 (c) N_2 (d) N_2O

24. Number of sigma bonds in P_4O_{10} is :
(a) 6 (b) 7 (c) 17 (d) 16

25. Which one of the following oxides of chlorine is obtained by passing dry chlorine over silver chlorate at 90°C ?
(a) Cl_2O (b) ClO_3 (c) ClO_2 (d) ClO_4

26. The number of hydrogen atom(s) attached to phosphorus atom in hypophosphorous acid is :
(a) three (b) one (c) two (d) zero

27. One mole of magnesium nitride on reaction with an excess of water gives :
(a) one mole of NH_3 (b) two moles of NH_3
(c) one mole of HNO_3 (d) two moles of HNO_3

28. A solution of potassium bromide is treated with each of the following. Which one would liberate bromine ?
(a) Hydrogen iodide (b) Sulphur dioxide
(c) Chlorine (d) Iodine

29. The gases respectively absorbed by alkaline pyrogallol and oil of cinnamon are :
(a) O_3 and CH_4 (b) O_2 and O_3
(c) SO_2 and CH_4 (d) N_2O and O_3.

30. Excess of KI reacts with $CuSO_4$ solution and then $Na_2S_2O_3$ solution is added to it. Which of the statements is **incorrect** for this reaction ?
(a) $Na_2S_2O_3$ is oxidised (b) CuI_2 is formed
(c) Cu_2I_2 is formed (d) Evolved I_2 is reduced

31. It is possible to obtain oxygen from air by fractional distillation because
(a) oxygen is in a different group of the periodic table from nitrogen.
(b) oxygen is more reactive than nitrogen.
(c) oxygen has higher b.p. than nitrogen.
(d) oxygen has a lower density than nitrogen.

32. A one litre flask is full of brown bromine vapours. The intensity of brown colour of vapours will not decrease appreciably on adding to the flask some :
(a) pieces of marble (b) animal charcoal powder
(c) carbon tetrachloride (d) carbon disulphide

33. Which one of the following species is not a pseudohalide?
(a) CNO^- (b) $RCOO^-$
(c) OCN^- (d) None of these

34. The correct order of the thermal stability of hydrogen halides (H–X) is :
(a) HI > HCl < HF > HBr (b) HCl< HF > HBr < HI
(c) HF > HCl > HBr > HI (d) HI < HBr > HCl < HF

35. Among the following oxoacids, the correct decreasing order of acid strength is:

(a) $HOCl > HClO_2 > HClO_3 > HClO_4$

(b) $HClO_4 > HOCl > HClO_2 > HClO_3$

(c) $HClO_4 > HClO_3 > HClO_2 > HOCl$

(d) $HClO_2 > HClO_4 > HClO_3 > HOCl$

36. Which one is most stable to heat –

(a) HClO (b) $HClO_2$

(c) $HClO_3$ (d) $HClO_4$

37. Sodium thiosulphate is prepared by :

(a) reducing Na_2SO_4 solution with H_2S.

(b) boiling Na_2SO_3 solution with S in alkaline medium.

(c) neutralising $H_2S_2O_3$ solution with NaOH.

(d) boiling Na_2SO_3 solution with S in acidic medium.

38. Which one of the following statements regarding helium is incorrect ?

(a) It is used to produce and sustain powerful superconducting magnets.

(b) It is used as a cryogenic agent for carrying out experiments at low temperatures.

(c) It is used to fill gas balloons instead of hydrogen because it is lighter and non-inflammable.

(d) It is used in gas-cooled nuclear reactors.

39. Which would quickly absorb oxygen ?

(a) Alkaline solution of pyrogallol

(b) Conc. H_2SO_4

(c) Lime water

(d) Alkaline solution of $CuSO_4$

40. Which of the following has maximum number of lone pairs associated with Xe ?

(a) XeF_4 (b) XeF_6 (c) XeF_2 (d) XeO_3

Skill Based MCQs

41. The compound that **does not** produce nitrogen gas by the thermal decomposition is :

(a) $Ba(N_3)_2$

(b) $(NH_4)_2Cr_2O_7$

(c) NH_4NO_2

(d) $(NH_4)_2SO_4$

42. Diborane (B_2H_6) reacts independently with O_2 and H_2O to produce, respectively;

(a) B_2O_3 and H_3BO_3

(b) B_2O_3 and $[BH_4]^-$

(c) H_3BO_3 and B_2O_3

(d) HBO_2 and H_3BO_3

43. Which of the following oxides will be the least acidic?

(a) As_4O_6

(b) As_4O_{10}

(c) P_4O_{10}

(d) P_4O_6

44. The correct order of the oxidation states of nitrogen in NO, N_2O, NO_2 and N_2O_3 is:

(a) $NO_2 < NO < N_2O_3 < N_2O$

(b) $NO_2 < N_2O_3 < NO < N_2O$

(c) $N_2O < N_2O_3 < NO < NO_2$

(d) $N_2O < NO < N_2O_3 < NO_2$

45. Which among the following is paramagnetic ?

(a) Cl_2O

(b) ClO_2

(c) Cl_2O_7

(d) Cl_2O_6

46. The number of pentagons in C_{60} and trigons (triangles) in white phosphorous, respectively, are :

(a) 20 and 3

(b) 12 and 4

(c) 12 and 3

(d) 20 and 4

47. The ease of liquefaction of noble gases increases in the order :

(a) He < Ne < Ar < Kr < Xe

(b) Xe < Kr < Ne < Ar < He

(c) Kr < Xe < He < Ne < Ar

(d) Ar < Kr < Xe < Ne < He

48. In compounds of type ECl_3, where E = B, P, As or Bi, the angles Cl - E- Cl for different E are in the order :

(a) B > P = As = Bi

(b) B > P > As > Bi

(c) B < P = As = Bi

(d) B < P < As < Bi

49. Which of the following represents correct sequence of decreasing acidic character of oxides?

(a) $N_2O_5 > NO > N_2O$

(b) $MnO > MnO_2 > MnO_4^-$

(c) $Cr_2O_3 > CrO_4^-$

(d) $Fe_2O_3 > FeO > Fe_3O_4$

50. Oxygen and sulphur both are the members of the same group in periodic table but H_2O is liquid while H_2S is gas because

(a) molecular weight of water is more.

(b) electronegativity of sulphur is more.

(c) H_2S is weak acid.

(d) water molecules are having weak hydrogen bonds between them.

ANSWER KEY

Conceptual MCQs																			
1	(a)	**3**	(c)	**5**	(a)	**7**	(c)	**9**	(d)	**11**	(b)	**13**	(c)	**15**	(d)				
2	(a)	**4**	(b)	**6**	(d)	**8**	(c)	**10**	(a)	**12**	(c)	**14**	(d)						
Application Based MCQs																			
16	(d)	**19**	(a)	**22**	(b)	**25**	(c)	**28**	(c)	**31**	(c)	**34**	(c)	**37**	(b)	**40**	(c)		
17	(d)	**20**	(b)	**23**	(b)	**26**	(c)	**29**	(b)	**32**	(a)	**35**	(c)	**38**	(c)				
18	(d)	**21**	(a)	**24**	(d)	**27**	(b)	**30**	(b)	**33**	(b)	**36**	(d)	**39**	(a)				
Skill Based MCQs																			
41	(d)	**42**	(a)	**43**	(a)	**44**	(d)	**45**	(b)	**46**	(b)	**47**	(a)	**48**	(b)	**49**	(a)	**50**	(d)