

**Hydrogen bonding**

21. The relatively high boiling point of  $HF$  is due to  
(a) Hydrogen bonding  
(b) Covalent bonding  
(c) Unshared electron pair on  $F$   
(d) Being a halogen acid
22. Water is liquid due to  
(a) Hydrogen bonding  
(b) Covalent bond  
(c) Ionic bond  
(d) Vander Waals forces
23. The maximum possible number of hydrogen bonds in which an  $H_2O$  molecule can participate is  
(a) 1  
(b) 2  
(c) 3  
(d) 4
24. Hydrogen bonding is maximum in  
(a) Ethanol  
(b) Diethyl ether  
(c) Ethyl chloride  
(d) Triethyl amine
25. The hydrogen bond is strongest in  
(a) Water  
(b) Ammonia  
(c) Hydrogen fluoride  
(d) Acetic acid
26. The high boiling point of ethanol ( $78.2^\circ C$ ) compared to dimethyl ether ( $-23.6^\circ C$ ), though both having the same molecular formulae  $C_2H_6O$ , is due to  
(a) Hydrogen bonding  
(b) Ionic bonding  
(c) Coordinate covalent bonding  
(d) Resonance
27. Methanol and ethanol are miscible in water due to  
(a) Covalent character  
(b) Hydrogen bonding character  
(c) Oxygen bonding character  
(d) None of these
28. B.P. of  $H_2O$  ( $100^\circ C$ ) and  $H_2S$  ( $-42^\circ C$ ) explained by  
(a) Vander Waal's forces  
(b) Covalent bond  
(c) Hydrogen bond  
(d) Ionic bond
29. Strength of hydrogen bond is intermediate between  
(a) Vander Waal and covalent  
(b) Ionic and covalent



- (c) Ionic and metallic  
(d) Metallic and covalent
30. In which of the following compounds intramolecular hydrogen bond is present  
(a) Ethyl alcohol  
(b) Water  
(c) Salicylaldehyde  
(d) Hydrogen sulphide
31. Hydrogen bonding is formed in compounds containing hydrogen and  
(a) Highly electronegative atoms  
(b) Highly electropositive atoms  
(c) Metal atoms with *d*-orbitals occupied  
(d) Metalloids
32. Which of the following compounds in liquid state does not have hydrogen bonding  
(a)  $H_2O$   
(b)  $HF$   
(c)  $NH_3$   
(d)  $C_6H_6$
33. Compounds showing hydrogen bonding among  $HF, NH_3, H_2S$  and  $PH_3$  are  
(a) Only  $HF, NH_3$  and  $PH_3$   
(b) Only  $HF$  and  $NH_3$   
(c) Only  $NH_3, H_2S$  and  $PH_3$   
(d) All the four
34. The high density of water compared to ice is due to  
(a) Hydrogen bonding interactions  
(b) Dipole-dipole interactions  
(c) Dipole-induced dipole interactions  
(d) Induced dipole-induced dipole interactions
35. Ethanol and dimethyl ether form a pair of functional isomers. The boiling point of ethanol is higher than that of dimethyl ether due to the presence of  
(a) Hydrogen bonding in ethanol  
(b) Hydrogen bonding in dimethyl ether  
(c)  $CH_3$  group in ethanol  
(d)  $CH_3$  group in dimethyl ether
36. Which of the following hydrogen bonds are strongest in vapour phase  
(a)  $HF - - - HF$   
(b)  $HF - - - HCl$   
(c)  $HCl - - - HCl$   
(d)  $HF - - - HI$
37. Which of the following shows hydrogen bonding





- (a)  $NH_3$                       (b)  $P$   
(c)  $As$                         (d)  $Sb$
38. The boiling point of a compound is raised by  
(a) Intramolecular hydrogen bonding  
(b) Intermolecular hydrogen bonding  
(c) Covalent bonding  
(d) Ionic covalent
39. The boiling point of water is exceptionally high because  
(a) Water molecule is linear  
(b) Water molecule is not linear  
(c) There is covalent bond between  $H$  and  $O$   
(d) Water molecules associate due to hydrogen bonding
40.  $NH_3$  has a much higher boiling point than  $PH_3$  because  
(a)  $NH_3$  has a larger molecular weight  
(b)  $NH_3$  undergoes umbrella inversion  
(c)  $NH_3$  forms hydrogen bond  
(d)  $NH_3$  contains ionic bonds whereas  $PH_3$  contains covalent bonds

