

Chemical bonding Assignment

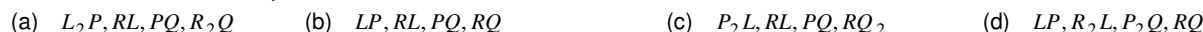
- An ionic compound A^+B^- is most likely to be formed when
 - The ionization energy of A is high and electron affinity of B is low
 - The ionization energy of A is low and electron affinity of B is high
 - Both, the ionization energy of A and electron affinity of B are high
 - Both, the ionization energy of A and electron affinity of B are low
- Which of the following statements concerning elements with atomic number 10 is true
 - It forms a covalent network of solids
 - It is monoatomic in nature
 - It has a very high value of electron affinity
 - It has extremely low value of ionisation energy
- In which of the following solvents, KI has highest solubility? The dielectric constant (ϵ) of each liquid is given in parentheses
 - C_6H_6 ($\epsilon = 0$)
 - $(CH_3)_2CO$ ($\epsilon = 2$)
 - CH_3OH ($\epsilon = 32$)
 - CCl_4 ($\epsilon = 0$)
- Which one is the highest melting halide
 - NaCl
 - NaF
 - NaBr
 - NaI
- Ionic reactions occur in
 - Aqueous solution and organic solvents of high polarity
 - Non-polar or solvents of low polarity
 - Gaseous state
 - Solid state
- The stability of ionic crystal depends principally on
 - High electron affinity of anion forming species
 - The lattice energy of crystal
 - Low I.E. of cation forming species
 - Low heat of sublimation of cation forming solid
- Which of the following statements about LiCl and NaCl is wrong
 - LiCl has lower melting point than NaCl
 - LiCl dissolves more in organic solvents whereas NaCl does not
 - LiCl would ionise in water more than NaCl
 - Fused LiCl would be less conducting electric than fused NaCl
- In K^+F^- , ionic radius of F^- is more than F while ionic radius of K^+ is
 - Less than K
 - More than F^-
 - Equal to F^-
 - None of these
- The energy that opposes dissolution of a solvent is
 - Hydration energy
 - Lattice energy
 - Internal energy
 - Bond energy
- Strongest bond is in
 - NaCl
 - CsCl
 - Both (a) and (b)
 - None of these
- Amongst LiCl, RbCl, $BeCl_2$ and $MgCl_2$, the compounds with the greatest and the least ionic character respectively are
 - LiCl and RbCl
 - RbCl and $BeCl_2$
 - RbCl and $MgCl_2$
 - $MgCl_2$ and $BeCl_2$
- The bonding is electrovalent in
 - NaCl
 - Br_2
 - PF_5
 - XeF_4
- On the basis of concept of ionic potential (ϕ), the tendency to form covalent bond in a group
 - Increases
 - Decreases
 - Remains unchanged
 - Shows erratic change
- The values of electronegativity of atoms A and B are 1.20 and 4.0 respectively. The percentage of ionic character in A-B bond is
 - 50%
 - 72.24%
 - 55.3%
 - 43%
- Which liquid is not deflected by a non-uniform electrostatic field
 - Water
 - Chloroform
 - Nitrobenzene
 - Hexane
- When ionic compounds get dissolved in water
 - They involve heat changes
 - Inter ionic attraction is reduced
 - Ions show dipole-ion attraction with water molecules
 - All of these
- Which forms a crystal of NaCl
 - NaCl molecules
 - Na^+ and Cl^- ions
 - Na and Cl atoms
 - None of these

GRAVITY CLASSES

18. The electronic configurations of four elements



The formulae of ionic compounds that could be formed between them are



19. Strongest bond is



20. Bond energy of covalent O–H bond in water is

- (a) Greater than bond energy of hydrogen bond (b) Equal to bond energy of hydrogen bond
(c) Less than bond energy of hydrogen bond (d) None of these

21. In which one of the following cases, breaking of covalent bond takes place

- (a) Boiling of H_2O (b) Melting of KCN (c) Boiling of CF_4 (d) Melting of SiO_2

22. Which of the following has least covalent P–H bond



23. Which of the following statements concerning a covalent bond is false

- (a) The electrons are shared between atoms
(b) The bond is non-directional
(c) The strength of the bond depends upon the extent of overlapping
(d) The bond formed may be polar or non-polar

24. Which of the following is not a characteristic of covalent compounds

- (a) It has low melting point and boiling point
(b) It is formed between two atoms having no or very small electronegativity difference
(c) They have no definite geometry
(d) They are generally insoluble in water

25. Which of the following statement is incorrect

- (a) Sodium hydride is ionic (b) Beryllium chloride is covalent
(c) CCl_4 gives a white ppt. with $AgNO_3$ solution (d) Bonds in $NaCl$ are non-directional

26. Which has higher bond energy and stronger bond



27. Which of the following about H_2O molecule is not true

- (a) The molecule has $\mu = 0$
(b) The molecule can act as a base
(c) The substance shows abnormally high boiling point in comparison to the hydrides of other elements of oxygen group
(d) The molecule has a bent shape

28. BF_3 and NF_3 both are covalent compounds but NF_3 is polar whereas BF_3 is non-polar. This is because

- (a) Nitrogen atom is smaller than boron atom
(b) N–F bond is more polar than B–F bond
(c) NF_3 is pyramidal whereas BF_3 is planar triangular
(d) BF_3 is electron deficient whereas NF_3 is not

29. The dipole moment of chlorobenzene is 1.73 D. the dipole moment of *p*-dichlorobenzene is expected to be



30. The dipole moment of $CHCl_3$ is 1.05 debye while that of CCl_4 is zero, because CCl_4 is

- (a) Linear (b) Symmetrical (c) Planar (d) Regular tetrahedral

31. Which bond angle, θ would result in the maximum dipole moment for the triatomic molecule XY_2



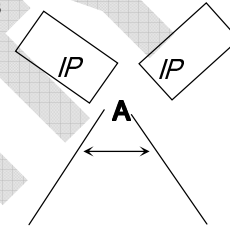
32. The dipole moment of HBr is 1.6×10^{-30} coulomb metre and interatomic spacing is 1 \AA . The % ionic character of HBr is



33. In which of the following there exists a $p\pi - d\pi$ bonding

- (a) Diamond (b) Graphite (c) Dimethyl amine (d) Trisilylamine

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34. Which of the following has $p\pi-d\pi$ bonding
 (a) NO_3^- (b) CO_3^{2-} (c) BO_3^{3-} (d) SO_3^{-2}
35. Among the following ions the $p\pi-d\pi$ overlap could be present in
 (a) NO_3^- (b) PO_4^{3-} (c) CO_3^{2-} (d) NO_2^{-1}
36. The geometry of the molecule with sp^3d^2 hybridized central atom is
 (a) Square planar (b) Trigonal bipyramidal (c) Octahedral (d) Square pyramidal
37. The shape of CO_2 molecule is similar to
 (a) H_2S (b) SO_2 (c) CS_2 (d) All
38. Among the following compounds the one that is polar and has the central atom with sp^2 hybridization is
 (a) H_2CO_3 (b) SiF_4 (c) BF_3 (d) $HClO_2$
39. Homolytic fission of C-C bond in ethane (CH_3-CH_3) given an intermediate in which carbon atom is
 (a) sp^3 hybridized (b) sp^2 hybridized (c) sp hybridized (d) sp^2d hybridized
40. In H_2O_2 molecule the angle between two O-H planes is (Crystalline phase)
 (a) 90° (b) 101° (c) 103° (d) 105°
41. Which of the following does not have a tetrahedral structure
 (a) BH_4^- (b) $(AlCl_3)_2$ (c) NH_4^+ (d) H_3O^+
42. Which one of the following compounds has sp^2 hybridization
 (a) CO_2 (b) SO_2 (c) N_2O (d) CO
43. Structurally, similar ions are
 (a) CH_4, PCl_4^+ (b) H_2O, I_3^- (c) SF_6, ICl_4 (d) $BeCl_2, SnCl_2$
44. The hybridization in PF_3 is
 (a) sp^3 (b) sp^2 (c) dsp^3 (d) d^2sp^3
45. Which one of the following has not triangular pyramidal shape
 (a) NH_3 (b) NCl_3 (c) PF_3 (d) BCl_3
46. For the molecule
- 
- (i) If B = P $\angle PAP = 92^\circ$
 The 'P' character of hybrid orbitals of A would be maximum in
 (a) (i) (b) (ii) (c) (iii) (d) (iv)
- (ii) If B = Q $\angle QAQ = 100^\circ$
- (iii) If B = R $\angle RAR = 105^\circ$
- (iv) If B = S $\angle SAS = 107^\circ$
47. Atomic orbitals of carbon in diamond are
 (a) sp hybridized (b) sp^2 hybridized (c) sp^3 hybridized (d) None hybridized
48. OF_2 is
 (a) Linear molecule and sp -hybridized (b) Tetrahedral molecule and sp^3 -hybridized
 (c) Bent molecule and sp^3 -hybridized (d) None of these
49. Which of the following molecule does not show tetrahedral shape
 (a) CCl_4 (b) $SiCl_4$ (c) SF_4 (d) CF_4
50. Which of the following is not tetrahedral
 (a) SCl_4 (b) SO_4^{2-} (c) $Ni(CO)_4$ (d) $NiCl_4^{2-}$