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Topic name bonding

CHEMISTRY **No. MCQ 45**

1. One mole of calcium phosphide on reaction with excess of water gives
(a) One mole of phosphine
(b) Two moles of phosphoric acid
(c) Two moles of phosphine
(d) One mole of phosphorus pentoxide

2. If two compounds have the same empirical formula but different molecular formula, they must have
(a) Different percentage composition
(b) Different molecular weights
(c) Same viscosity
(d) Same vapour density

3. Which forms a crystal of $NaCl$
(a) $NaCl$ molecules (b) Na^+ and Cl^- ions
(c) Na and Cl atoms (d) None of the above

4. When sodium and chlorine reacts then
(a) Energy is released and ionic bond is formed
(b) Energy is released and a covalent bond is formed
(c) Energy is absorbed and ionic bond is formed
(d) Energy is absorbed and covalent bond is formed

5. Which one is least ionic in the following compounds.
(a) $AgCl$ (b) KCl (c) $BaCl_2$ (d) $CaCl_2$

6. Which of the following does not have a coordinate bond
(a) SO_2 (b) HNO_3 (c) H_2SO_3 (d) HNO_2

7. Which molecules has zero dipole moment
(a) H_2O (b) CO_2 (c) HF (d) HBr

8. In the following which one have zero dipole moment
(a) BF_3 (b) CCl_4
(c) $BeCl_2$ (d) All of these

9. Which molecule has the largest dipole moment
(a) HCl (b) HI (c) HBr (d) HF

10. BF_3 and NF_3 both molecules are covalent, but BF_3 is non-polar and NF_3 is polar. Its reason is
(a) In uncombined state boron is metal and nitrogen is gas
(b) $B-F$ bond has no dipole moment whereas $N-F$ bond has dipole moment
(c) The size of boron atom is smaller than nitrogen
(d) BF_3 is planar whereas NF_3 is pyramidal

11. Which type of overlapping results the formation of a π bond
(a) Axial overlapping of $s-s$ orbitals
(b) Lateral overlapping of $p-p$ orbitals
(c) Axial overlapping of $p-p$ orbitals
(d) Axial overlapping of $s-p$ orbitals

12. Which molecule is linear
(a) NO_2 (b) ClO_2 (c) CO_2 (d) H_2S

13. Which of the following molecules has trigonal planer geometry
(a) IF_3 (b) PCl_3 (c) NH_3 (d) BF_3

14. A sp^3 hybridized orbital contains
(a) $\frac{1}{4}s$ – character (b) $\frac{1}{2}s$ – character
(c) $\frac{2}{3}s$ – character (d) $\frac{3}{4}s$ – character

15. The enolic form of acetone contains
(a) 9 sigma bonds, 1 pi bond and 2 lone pairs
(b) 8 sigma bonds, 2 pi bonds and 2 lone pairs
(c) 10 sigma bonds, 1 pi bond and 1 lone pair
(d) 9 sigma bonds, 2 pi bonds and 1 lone pair

16. Point out incorrect statement about resonance
(a) Resonance structures should have equal energy
(b) In resonance structures, the constituent atoms should be in the same position
(c) In resonance structures, there should not be the same number of electron pairs
(d) Resonance structures should differ only in the location of electrons around the constituent atoms

17. The number of possible resonance structures for CO_3^{2-} is
(a) 2 (b) 3 (c) 6 (d) 9

18. The bond angle in PH_3 would be expected to be close to
(a) 90^o (b) 105^o (c) 109^o (d) 120^o

19. In which molecule are all atoms coplanar.
(a) CH_4 (b) BF_3 (c) PF_3 (d) NH_3

20. Which has the least bond angle
(a) NH_3 (b) BeF_2 (c) H_2O (d) CH_4

21. Which of the following species is the least stable
(a) O_2 (b) O_2^{-2} (c) O_2^{+1} (d) O_2^{-1}

22. In the following which has highest boiling point
(a) HI (b) HF (c) HBr (d) HCl

23. The difference of number of sigma bonds and π bonds in 1, 3, 5-tricyanobenzene is –
(a) 5 (b) 3 (c) 6 (d) Zero

24. Which of the following does not conduct electricity ?
(a) Molten NaOH (b) Molten KOH
(c) Solid NaCl (d) Aqueous NaCl

25. The geometry of IF_7 is
(a) Heptagonal (b) Octahedral
(c) Trigonalbipyramidal (d) Pentagonal bipyramidal

26. Which of the following statement about repulsion between bond pairs (bp) and lone pairs (lp) is correct?
(a) $\ell p - \ell p > \ell p - bp > bp - bp$
(b) $\ell p - bp > \ell p - \ell p > bp - bp$
(c) $bp - bp > \ell p - bp > \ell p - \ell p$
(d) None

27. The correct order of the strength of H-bonds is
(a) H……F > H……O > H……N
(b) H……N > H……O > H……F
(c) H……O > H……N > H……F
(d) H……F > H……N > H……O

28. Boiling point of H_2O is higher than that of H_2S, because the former
(a) Is capable of forming H-bonds

(b) Has higher molecular mass
(c) Has relatively strong covalent bonds
(d) Is capable of forming co-ordinate bonds with H^+ ions

29. The hybrid state of I in IF_5 is

(a) sp^3d^2 (b) sp^3d^3 (c) sp^3d (d) sp^3

30. On the basis of intermolecular forces predict the correct order of decreasing boiling points of the compounds –

(a) $CH_3OH > H_2 > CH_4$ (b) $CH_3OH > CH_4 > H_2$

(c) $CH_4 > CH_3OH > H_2$ (d) $H_2 > CH_4 > CH_3OH$

31. The number of lone pairs on Xe in XeF_2, XeF_4 and XeF_6 respectively are :

(a) 3, 2, 1 (b) 2, 4, 6 (c) 1, 2, 3 (d) 6, 4, 2

32. The hybridisation of the underline atom changes in :

(a) AlH_3 changes to AlH_4^- (b) H_2O changes to H_3O^+

(c) NH_3 changes to NH_4^+ (d) In all cases

33. Which statement is correct about hybridization ?

(a) In hybridisation orbitals take part
(b) In hybridisation electrons take part
(c) In hybridisation fully filled , half filled or empty orbitals can take part
(d) Hybridised orbitals only contains bond pair electron

34. Which of the following contains both electrovalent and covalent bonds ?

(a) CH_4 (b) H_2O_2 (c) NH_4Cl (d) None

35. Which of the following statements is not correct for sigma and pi bond formed between two carbon atoms?

(a) Free rotation of atoms about a sigma - bond is allowed but not in case of a pi-bond
(b) Sigma -bond determines the direction between carbon atoms but a pi-bond has no primary effect in this regard
(c) Sigma-bond is stronger than a pi-bond
(d) Bond energies of sigma- and pi-bonds are of the order of 264 kJ/mol and 347 kJ/mol. respectively.

36. The correct order of decreasing polarizability of ion is :

(a) Cl^-, Br^-, I^-, F^- (b) F^-, I^-, Br^-, Cl^-

(c) I^-, Br^-, Cl^-, F^- (d) F^-, Cl^-, Br^-, I^-

37. $SnCl_4$ is a covalent liquid because :

(a) Electron clouds of the Cl^- ions are weakly polarized to envelop the cation.
(b) Electron clouds of the Cl^- ions are strongly polarized to envelop the cation.
(c) Its molecules are attracted to one another by strong van der Waals forces.
(d) Sn shows inert pair effect.

38. Which of the following statement is false for trisilylamine ?

(a) Three sp^2 orbitals are used for σ bonding, giving a plane triangular structure.
(b) The lone pair of electrons occupy a p-orbital at right angles to the plane triangle and this overlaps with empty p–orbitals on each of the three silicon atoms resulting in π bonding.
(c) The N–Si bond length is shorter than the expected N–Si bond length.
(d) It is a weaker Lewis base than trimethyl amine.

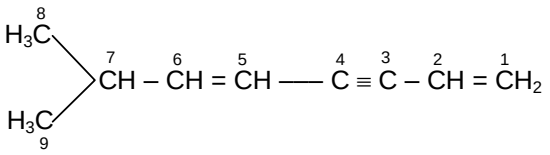
39. Number of antibonding electrons in N_2 is :

(a) 4 (b) 10 (c) 12 (d) 14

40. The compound which contains both ionic and covalent bond is

(a) KCN (b) KCl (c) H_2 (d) CH_4

41. In the following structure



how many carbon atom is sp^2hybridised

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

42. The number of σ and π bonds in vinyl acetate are

(a) 11σ& 2π (b) 9σ& 4 π
(c) 2σ& 11π (d) 10σ& 3π

43. The bonds are N_2O_5 in

(a) Only ionic (b) Only covalent
(c) Covalent and ionic (d) Covalent & Coordinates

44. Which one has a coordinate bond?

(a) Al_2Cl_6 (b) BF_3 (c) NaCl (d) O_2

45. The species which does not show paramagnetism is

(a) O_2 (b) O_2^+ (c) O_2^{2-} (d) H_2^+