CHEMISTRY

31. The shape of sulphate ion is
(1) square planar
(2) triagonal
(3) trigonal planar
(4) tetrahedral

32. In which of the following species, all the three types of hybrid carbons are present?
(1) $CH_2 = C = CH_2$
(2) $CH_3 - CH - CH - CH_2^+$
(3) $CH_3 - C \equiv C - CH_2^+$
(4) $CH_3 - CH = CH - CH_2^-$

33. Which of the following substances has the greatest ionic character?
(1) Cl_2O (2) NCl_3
(3) $PbCl_2$ (4) $BaCl_2$

34. Among the following species, identify the pair having same bond order CN^-, O_2^-, NO^+, CN^+
(1) CN^- and O_2^-
(2) O_2^- and NO^+
(3) CN^- and NO^+
(4) CN^- and CN^+

35. Bond order in benzene is
(1) 1 (2) 2
(3) 1.5 (4) None

36. In O_2^-, O_2 and O_2^{2-} molecular species, the total number of antibonding electrons respectively are
(1) 7, 6, 8 (2) 1, 0, 2
(3) 6, 6, 6 (4) 8, 6, 8

37. Which one of the following molecules will form a linear polymeric structure due to hydrogen bonding?
(1) NH_3 (2) H_2O
(3) HCl (4) HF

38. Among the following series of transition metal ions, the one where all metal ions have $3d^2$ electronic configuration is
(Atomic numbers Ti = 22; V = 23; Cr = 24; Mn = 25)
(1) $Ti^{3+}, V^{2+}, Cr^{3+}, Mn^{4+}$
(2) $Ti^{+}, V^{4+}, Cr^{6+}, Mn^{7+}$
(3) $Ti^{4+}, V^{3+}, Cr^{2+}, Mn^{3+}$
(4) $Ti^{2+}, V^{3+}, Cr^{4+}, Mn^{5+}$

39. Highest oxidation state of manganese in fluoride is +4 (MnF_4) but highest oxidation state in oxides is +7 (Mn_2O_7) because _____
(1) fluorine is more electronegative than oxygen.
(2) fluorine does not possess d-orbitals.
(3) fluorine stabilises lower oxidation state.
(4) in covalent compounds fluorine can form single bond only while oxygen forms double bond.

40. Four successive members of the first series of the transition metals are listed below. For which one of them the standard potential $\left(E^0_{M^{2+}|M}\right)$ value has a positive sign?
(1) Co (Z = 27) (2) Ni (Z = 28)
(3) Cu (Z = 29) (4) Fe (Z = 26)