CHEMISTRY
SECTION-A

51. The compound which cannot be formed is
(1) He (2) He^+ (3) He_2 (4) He^{+2}

52. The hybrid state of S in SO_3 is similar to that of
(1) C in C_2H_2 (2) C in C_2H_4 (3) C in CH_4 (4) C in CO_2

53. Assertion : BF_3 molecule has zero dipole moment.
Reason : F is electronegative and B–F bonds are polar in nature.
(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(3) Assertion is correct, reason is incorrect
(4) Assertion is incorrect, reason is correct.

54. Assertion : CH_2Cl_2 is non-polar and CCl_4 is polar molecule.
Reason : Molecule with zero dipole moment is non-polar in nature.
(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(3) Assertion is correct, reason is incorrect
(4) Assertion is incorrect, reason is correct.

55. The correct statement with regard to H_2^+ and H_2^- is
(1) both H_2^+ and H_2^- are equally stable (2) both H_2^+ and H_2^- do not exist
(3) H_2^- is more stable than H_2^+ (4) H_2^+ is more stable than H_2^-

56. Which of the following corresponds unstable molecule?
Here N_b is number of bonding electrons and N_a is number of antibonding electrons.
(1) $N_b > N_a$ (2) $N_b < N_a$ (3) $N_a = N_b$ (4) Both (2) and (3)

57. The given increasing order of energies of various molecular orbitals is not true for which of the following molecule?
$$\sigma 1s < \sigma^* 1s < \sigma 2s < \sigma^* 2s < \left(\pi 2p_x = \pi 2p_y\right) < \sigma 2p_z < \left(\pi^* 2p_x = \pi^* 2p_y\right) < \sigma^* 2p_z$$
(1) B_2 (2) C_2 (3) N_2 (4) O_2

58. The molecule which has zero dipole moment is
(1) CH_3Cl (2) NF_3 (3) BF_3 (4) ClO_2

59. Which of the following has dipole moment?
(1) CO_2 (2) *p*-dichlorobenzene (3) NH_3 (4) CH_4

60. In the formation of N_2^+ from N_2, the electron is lost from:
(1) a σ-orbital (2) a π-orbital (3) a σ^*-orbital (4) a π^*-orbital