INORGANIC CHEMISTRY – I

(Common for B.Sc., Bio-Tech and B.Sc. Industrial Microbiology – Semester-IV)

Time Allowed : Three Hours **Maximum Marks : 35**

Note : Attempt five questions, selecting two questions each from Sections A and B. Question No. IX (Section-C) is compulsory.

SECTION-A

I. (a) How acids and bases are classified as hard and soft.
(b) Discuss the symbiosis. (3½×2=7)

II. (a) What is the theoretical basis of hardness and softness.
(b) Explain how electronegativity affects and hardness and softness. (3½×2=7)

III. Discuss the role of essential and trace elements in the biological processes. (7)

IV. Briefly discuss nitrogen fixation. (7)

SECTION–B

V. What are phosphazenes and triphosphazenes ? Discuss the nature of bonding in them. (7)

VI. Discuss the classification of organometallic compounds. (7)

VII. Give a brief account of metal-alkene complexes. (7)

VIII. Discuss the preparation, properties, bonding and applications of the alkyls of Li and Hg. (7)

SECTION–C
(Compulsory Question)

IX. Answer all the following :

(a) Which is more hard acid Hg^{+} or Hg^{2+} and which is a soft base F^{-} or Cl^{-} or Br^{-}.

(b) Define silicone.

(c) Give the role of Ca^{2+} ion in biological systems.

(d) Name the following organometallic compounds :

(i) $[PtCl_2(NH_3)_2]$

(ii) $(C_2H_5)_3Al$.

(e) Define homogeneous hydrogenation ?

(f) Give two reactions for the synthesis of Al alkyls.

(g) Draw the structure of $[Fe(CO)_4]^{2-}$ (1×7=7)