AS/2051 5893/MH

INORGANIC CHEMISTRY

SEMESTER-II

Time Allowed: 3 hours Maximum Marks : 26

Note: -

(1) The candidates are required to attempt five questions selecting two questions each from Section A and B. Section C (Question 9) is compulsory.

(2) Each question of Section A and B carries 4 marks and Section C has five short questions carrying 2 marks each.

## Section A

1 Draw a labeled diagram of fluorite structure and discuss its salient features. Calculate the total number of cations and anions per unit cell. Name any two compounds which adopt this structure. (4)

2 (a) What is Born-Haber cycle? How does it help in estimating proton affinity? Explain by taking example of Ammonium Chloride.

(b) Name and explain any two stoichiometric defects in detail. Discuss the differences between them. (2, 2)

3 (a) Discuss the role of alkali and alkaline earth metals in biological systems.

(b) Give an example each of crown ether complexes of $Li_+$, $Na_+$ and $K_+$. Also comment on the importance of ring cavity size. (2, 2)

4 (a) The trihalides of Boron can act as Lewis acids. Discuss the trend of their acidic strength on the basis of back bonding.

(b) Discuss any three properties in which Boron differs from other elements of group 13. What are the reasons for this anomalous behaviour of Boron? (2, 2)

## Section B

5 (a) Explain why $SiCl_4$ reacts with water while $CCl_4$ does not.

(b) Write a short note on fullerenes. (2, 2)

6 Explain the following:

Contd—2

(a) $NH_3$ is basic while $NF_3$ is not.

(b) $N_2$ is inert while $P_4$ is highly reactive. (2, 2)

7 (a) $H_2SO_3$ acts as both oxidizing as well as reducing agent while $H_2SO_4$ acts as an oxidizing agent only.

(b) $H_2Te$ is a stronger acid than $H_2S$. Explain why. (2, 2)

8 (a) What are polyhalides? Discuss their properties.

(b) Write a brief note on the oxides of halogens. (2, 2)

## Section C

9 Attempt all questions: (5x2=10)

(a) List the limitations of radius ratio rule.

(b) Gallium, Iridium and Thallium show +1 as well as +3 oxidation state. Comment.

(c) Discuss any two functions of $Ca^{2+}$ ions in biosystem.

(d) What are fluorocarbons? Mention any two applications.

(e) Balance and complete the following:

(i) $PH_3 + NO \rightarrow$

(ii) $Mg_3N_2 + HCl \rightarrow$