

DECEMBER 2014

P/ID 40122/PCHB

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. The relative strength of the following as Lewis acid is in the order $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$. Why?
2. Diborane (B_2H_6) cannot be methylated beyond $(\text{CH}_3)_4\text{B}_2\text{H}_2$. Why?
3. In borazine $\text{B}_3\text{N}_3\text{H}_6$ there is no complete delocalisation of π electrons as in benzene. Why?
4. What are Zintl ions or Naked clusters?
5. The stability constant of $[\text{Co}(\text{CN})_6]^{3-}$ in aqueous medium is much higher than that of $[\text{Co}(\text{CN})_6]^{4-}$. Why?
6. What is meant by 'fac' and 'catena' in the nomenclature of inorganic compounds?
7. How is migration current suppressed in polarography?

8. What are indicator electrodes and reference electrodes in amperometry?
9. What is meant by marking agent in complexometric titrations?
10. What is meant by 'debug' in computer operation?

PART B — (4 × 20 = 80 marks)

Answer ALL questions.

11. (a) (i) Write a note on the structure of silicates. (8)
- (ii) Discuss the similarities between borazine and benzene. (6)
- (iii) Discuss the structure and bonding in diborane. (6)

Or

- (b) (i) Write a note on molecular sieves. (6)
- (ii) Write a note on phosphonitrilic compounds. (7)
- (iii) Discuss the structure of metal clusters. (7)

2 **P/ID 40122/PCHB**

12. (a) (i) Write a note on ORD. (6)
- (ii) What are porphyrins? Explain the structure. (7)
- (iii) Explain the principles of determination of stability constant by spectrophotometric method. (7)

Or

- (b) (i) Write a note on HSAB principle. (5)
- (ii) Comment on the functions of hemoglobin and myoglobin. List out the differences. (8)
- (iii) Explain the determination of stability constant of complexes by potentiometric method. (7)
13. (a) (i) Discuss on the following in connection with polarography.
- (1) Residual current
- (2) Migration current
- (3) Half wave potential. (9)
- (ii) What are the advantages of amperometric titrations? (5)
- (iii) Explain back titration in complexometric titrations. (6)

Or

3 **P/ID 40122/PCHB**

- (b) (i) What are the advantages and disadvantages of DME in polarography? (6)
- (ii) Discuss the various types of titration curves in amperometry. (6)
- (iii) Explain the terms in complexometry :
- (1) Buffer action and
- (2) Replacement titration. (8)
14. (a) (i) Discuss on the useful softwares available in chemistry. (10)
- (ii) Write a program for the determination of normality and molarity of solutions. (10)

Or

- (b) (i) Discuss on the usage of internet in chemistry research. (10)
- (ii) Write a program for the determination of concentration a complex using Beer Lambert's law. (10)