

DECEMBER 2015

P/ID 40125/PCHE

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. $(\text{Co}(\text{NH}_3)_6)^{3+}$ is diamagnetic while $[\text{CoF}_6]^{-3}$ is paramagnetic. Why?
2. What is meant by nephelauxetic effect?
3. Calculate the CFSE for d^5 in weak field and strong field cases in octahedral field.
4. What is meant by Bohr effect in the activity of hemoglobin?
5. What is a Ferromagnetic substance?
6. What is Polymorphism in solid state?
7. What is meant by metal excess defect?
8. Solid-gas chromatography. What is the inference given by the terms?

9. In which region of the electromagnetic spectrum, the atomic absorption spectra lie?
10. What is DTA? What is the property measured in it?

PART B — (4 × 20 = 80 marks)

Answer ALL questions.

11. (a) (i) Explain the splitting of d-orbitals in octahedral and tetragonal fields. (10)
- (ii) Discuss the effect of spin-orbit coupling on the magnetic properties of coordination complexes. (10)

Or

- (b) (i) Describe the concepts in crystal field theory. How the drawbacks are rectified in MOT for complexes? (10)
- (ii) Explain Jahn-Teller effect. (10)
12. (a) (i) Discuss the role of hemoglobin as oxygen carrier. (10)
- (ii) Write a note on metallo-enzymes. What is meant by inhibition and poisoning of enzyme. (10)

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- (b) (i) Explain the terms :
- (1) Sodium pump
 - (2) Trigger mechanism. (5 + 5 = 10)
- (ii) Discuss on the biological fixation of nitrogen. (10)

13. (a) (i) Describe X-ray powder diffraction method. (10)
- (ii) Explain the behaviour of materials with diamagnetism and paramagnetism. (10)

Or

- (b) Write notes on :
- (i) Electron diffraction
 - (ii) Defects in solids
 - (iii) Super conductors
 - (iv) Order-disorder transformation. (4 × 5 = 20)

14. (a) Write notes on :
- (i) Temperature programming in GLC
 - (ii) Carrier gas in GLC
 - (iii) Isotope dilution analysis
 - (iv) Types of flame in AAS. (4 × 5 = 20)

Or

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- (b) (i) Explain about the essential parts in the instrumentation of GC. (10)
- (ii) TGA and DTA are complimentary techniques. Discuss on this statement. (10)
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