

DECEMBER 2014

P/ID 40125/PCHE

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is dynamic Jahn-Teller effect?
2. What is the ground state term symbol for a d^3 ion in an octahedral ligand field?
3. Mention the differences in the ring systems present in chlorophyll and vitamin – B₁₂.
4. Mention the role of carbonic peptidase enzyme.
5. Distinguish an electron carrier from that of oxygen carrier.
6. What is diffusion co-efficient?
7. What is non-stoichiometric compound? Give example.
8. What happens to the electrical conductivity of semiconductor when the temperature is raised?
9. Sketch the DTA curve of calcium acetate monohydrate.
10. What is the significance of retention volume?

PART B — (4 × 20 = 80 marks)

Answer ALL questions.

11. (a) (i) Construct M.O. diagram of an octahedral complex with sigma bonding. Calculate its bond order. (10)
- (ii) What are charge transfer spectra? Discuss their types in detail. (10)

Or

- (b) (i) Discuss the spectral and magnetic behaviour of transition metal complexes. (10)
- (ii) Draw the Orgel diagram for d^1 and d^2 systems. What is the difference between an Orgel diagram and Tanabe – Sugano diagrams? (10)
12. (a) (i) Describe the structure and functions of Haemoglobin. (10)
- (ii) What is Nitrogen fixation? Explain its types and discuss the structure and function of nitrogenase enzyme. (10)

Or

- (b) (i) Discuss the structure and enzymatic activity of superoxide dismutase. (10)
- (ii) Explain the role of sodium, potassium, calcium, zinc and copper in biological systems. (10)

13. (a) (i) Distinguish between (1) Neutron scattering factor and x-ray scattering factor (2) Ferro magnetism and anti ferro magnetism. (10)
- (ii) Give short notes on the following:
(1) Super conductors
(2) Inorganic phosphorus compounds. (10)

Or

- (b) (i) What are different types of spinels? Show how a normal spinel differs from an inverse spinel. (10)
- (ii) Give short notes on the following:
(1) Solid state lasers
(2) Order-disorder transformation in solid solutions. (10)
14. (a) (i) Explain in detail the principle and applications of isotopic dilution analysis. (10)
- (ii) Explain briefly "Atomic absorption spectroscopy". (10)

Or

- (b) (i) Discuss the principle, advantages and disadvantages of electron capture detector in GC . (10)
- (ii) Explain briefly "Radio Immuno assay". (10)