

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer :

- The carbonate ion in transferrin is a _____ ligand
(a) bidentate (b) unidentate
(c) tridentate (d) hexadentate
- The electronic configuration of Cobalt in vitamin B₁₂ is _____.
(a) $t_{2g}^6 e_g^1$ (b) $t_{2g}^5 e_g^2$
(c) t_{2g}^6 (d) $t_{2g}^4 e_g^2$

- The geometry of zinc in carbonic anhydrase is _____.
(a) See-Saw
(b) Distorted trigonal bipyramid
(c) Tetrahedral
(d) Square pyramidal
- The electronic configuration of iron in oxy haemoglobin is _____.
(a) $t_{2g}^4 e_g^2$ (b) $t_{2g}^3 e_g^2$
(c) t_{2g}^5 (d) t_{2g}^6
- _____ is non heme protein
(a) Hemerythrin (b) Myoglobin
(c) Cytochromes (d) Haemoglobin
- In oxidised form of Rubredoxin iron has _____ electronic configuration
(a) t_{2g}^5 (b) $t_{2g}^3 e_g^2$
(c) $t_{2g}^4 e_g^1$ (d) $t_{2g}^4 e_g^2$
- The number of molybdenum atoms in molybdenum-nitrogenase enzymes is _____.
(a) 1 (b) 3
(c) 2 (d) 4

- The P cluster in nitrogenase enzyme contains _____ cluster.
(a) FeS₀ (b) Fe₂S₂
(c) Fe₄S₃ (d) Fe₄S₄
- The decrease in efficiency of light phase reaction at 680 nm is called as _____.
(a) Red drop (b) Red shift
(c) Blue drop (d) Blue shift
- Technetium tracers are produced from _____.
(a) MnO₄²⁻ (b) MoO₄²⁻
(c) Cr₂O₇²⁻ (d) OsO₄²⁻
- Over treatment of excess of zinc leads to deficiency of _____.
(a) Haemoglobin (b) Manganese
(c) Copper (d) Myoglobin
- The kinetics of oxidation of antidiabetic drug by vanadium(v) is _____ order reaction.
(a) Zero (b) Second
(c) Third (d) First

- The enzyme that catalyses the addition and elimination reactions is _____.
(a) Lyases (b) Hydrolases
(c) Ligases (d) Oxidoreductases
- At low substrate concentration the order of enzyme kinetics is _____.
(a) Zero (b) First
(c) Pseudo-first (d) Second
- The inhibitor is regarded as substrate analogue in _____ inhibition.
(a) Irreversible (b) Non competitive
(c) Competitive (d) Uncompetitive

PART B — (5 × 4 = 20 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

- (a) Write a note on bacterial iron transport.
Or
(b) Discuss the structure and function of SOD.
- (a) Give a brief account of physiology of haemoglobin and myoglobin.
Or
(b) Write a note on cyanide poisoning.

18. (a) Explain the role of magnesium in the structure of chlorophyll.

Or

- (b) Write a note on fixation of nitrogen by molybdenum and titanium complexes.

19. (a) Write a note on vanadium compounds as antidiabetic drugs.

Or

- (b) Give a brief account on toxicity and remedies of the elements Zn, Cd, Hg and Pb.

20. (a) What is V_{max} ? How will you determine it? Write its significance.

Or

- (b) What is Lineweaver-Burg plot? Sketch and explain the Lineweaver-Burg plots various reversible inhibitions.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)

Each answer should not exceed 600 words.

21. (a) Explain the structure and processes involved in the storing of iron by ferritin.

Or

- (b) Discuss the structure and functions of Vitamin B₁₂.

22. (a) Write a note on

(i) Structure and catalytic cycle of cytochrome P₄₅₀.

(ii) Structure and function of hemocyanin.

Or

- (b) Write a note on dioxygen binding of haemoglobin and hematin.

23. (a) Explain the structure of dinitrogenase complex and its role in the fixation of nitrogen.

Or

- (b) Explain the electron transport sequence of Photosynthesis.

24. (a) Write a note on role of chelation therapy in the treatment of iron overload and cancer.

Or

- (b) Write a note on different imaging agents.

25. (a) Derive Michaelis – menten equation

Or

- (b) Write a note on effect of metal activators and substrate concentration on the efficiency of enzyme.