



Register Number:

Date: 17-11-2020

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27

M.Sc. CHEMISTRY - III SEMESTER

SEMESTER EXAMINATION: NOVEMBER 2020

CH 9118 :BIOLOGICAL CHEMISTRY

Time- 2 ½ hrs

Max Marks-70

This paper contains 4 printed pages and 3 parts

PART A

Answer any 6 out of 8 questions. Each question carries 2 marks. 6 x 2 = 12

- 1) Name two ways of metal detoxification in biological systems.
- 2) How is iron stored in the body?
- 3) What is binding affinity of ligands and macromolecules? Give its significance?
- 4) How does an endergonic process occur spontaneously in the cell?
- 5) What are ionophores? Give the structure of a naturally occurring ionophore.
- 6) In what ways is the Eadie – Hofstee plot superior to the Lineweaver Burk plot?
- 7) What is the hill plot? What information is obtained from it?
- 8) What is the main role of Ca^{2+} in signal transduction?

PART B

Answer any 4 out of 6 questions. Each question carries 12 marks. 4 x 12 = 48

- 9) (a) Explain the role of Gold and platinum complexes in medicine?
(b) What do you understand by the phenomenon of co-operativity? Discuss the oxygen saturation curves of Hb and Mb?
(6+6)
- 10) (a) What is meant by nitrogen fixation? Explain the catalytic activity of nitrogenase.
(b) Give a schematic diagram of the active site of (i) Peroxidase (ii) Ascorbic acid oxidase
(6+6)

- 11) (a) Discuss the catalytic role of the metal ion in the functioning of the non-redox enzyme Carbonic anhydrase?
 (b) Explain the mechanism of the active transport of Na^+ and K^+ ions across the cell membrane? What is the role of ATP in the process? (6+6)
- 12) (a) Give the reactions involved in the formation of mevalonate from acetyl CoA? How is its production regulated?
 (b) What are the salient features of the genetic code. Explain how termination occurs in protein biosynthesis? (6+6)
- 13) (a) Draw the structure of Lipoic acid, and explain how it carries out its dual function in acyl group and electron transfer reactions?
 (b) Give an example of reactions involving the following coenzymes
 (i) CoA (ii) PLP (iii) FAD (6+6)
- 14) (a) Give a schematic diagram of the active site of Lysozyme? What are the characteristics of the substrate that can bind to lysozyme?
 (b) Myosin plays an important role in the sliding filament model of muscle contraction? Explain the mechanism by which this happens. (6+6)

PART C

Answer any 2 out of 3 questions. Each question carries 5 marks (2 x 5 = 10)

- 15) a) The hydrolysis of acetylcholine is catalyzed by the enzyme acetylcholine esterase, which has a turnover rate of $25,000\text{s}^{-1}$. Calculate how long it would take for the enzyme to cleave one acetylcholine molecule.
 b) What side chains would you expect to find at the active site of an enzyme if the optimal pH is i) 5 and ii) 12, Why? (2+3)
- 16) a) What is the fundamental requirement of a metal centre to be present in a redox metalloenzyme? Give an example in support of your answer.
 b) Name any four interactions that are involved in stabilizing the structures of biopolymers (3+2)
- 17) a) Is cis-trans mechanism of retinal important in the chemistry of vision. Why?
 b) What are the specific properties that make the metal ion Mg^{2+} as the central atom in chlorophyll? (2+3)

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