

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

M.Sc. CHEMISTRY- III SEMESTER

Special Supplementary Examination, JUNE 2019

CH 9417: Biological Chemistry

Time: 2½hrs

Max Marks: 70

Supplementary candidates only.
Attach the question paper with the answer booklet

Instructions: The question paper is in three parts A, B, and C. It consists of a total of 17 questions. Give chemical equations and formulae wherever applicable.

Part-A

Answer any **six** of the following questions. Each question carries 2 marks. **2×6=12Marks**

1. What is meant by essential trace elements? Give two examples.
2. Name the molecules that transport Iron and Copper.
3. Write the structure of one gold complex and one platinum complex used in medicine.
4. What are siderophores? Draw the metal chelating sites of a siderophore.
5. How is energy generated for muscle contraction?
6. Write the codons which are involved in initiation and termination of translation.
7. Write the structure of BAL. Why is it used?
8. Mention the biological role of cobalamine in humans.

Part-B

Answer any **four** of the following questions. Each question carries 12 marks. **4×12=48Marks**

9. a) Explain the mechanism of electron transport in the PSI and PSII in the photosynthetic process?
b) Explain the mechanism of propagation of neural signals in nerve tissue. (6+6)
10. a) Write the structure and give the function of coenzyme A.

- b) How are thermodynamically unfavourable reactions taking place spontaneously in the living system? Explain with examples. (6+6)
11. a) What are the factors that affect the oxygen saturation curves of haemoglobin and myoglobin? Explain using graphical representations.
- b) Explain the mechanism of action of the coenzymes NAD^+ and FAD^+ using a suitable example? (6+6)
12. a) Explain briefly the translation process.
- b) Explain how hydrophobic interactions are entropy driven processes and are responsible for the cold denaturation of proteins. What are the other interactions seen in the living system? Give examples. (6+6)
13. a) What are the fragments obtained when chymotrypsin family of enzymes acts on the following polypeptide Asp-Leu-Glu-His-Phe-Gly-Gly-Pro-Lys-His-Meth (list them)?
- b) Explain the mechanism of action of catalase and alcohol dehydrogenase? (6+6)
14. a) Draw the schematic diagram to show electron transport in bacterial nitrogenase system.
- b) Explain the mechanism and function of carboxypeptidase A. (6+6)

Part-C

Answer any **two** of the following questions. Each question carries 5 marks. **2×5=10Marks**

15. An experiment measuring velocity verses substrate concentration was run, first in the absence of A and then in the presence of substance 'A' the following data was obtained

[S]	Velocity in the absence of 'A'	Velocity in the presence of 'A' ($\mu\text{mole}/\text{min}$)
2.5	0.32	0.20
3.3	0.40	0.26
5.0	0.52	0.36
10.6	0.69	0.56

Is the substance 'A' an activator or an inhibitor? If it is an inhibitor, what kind of inhibitor?

16. For a reaction $\text{A} \rightleftharpoons \text{B}$ $\Delta G^{\circ} = -71 \text{ k cal mol}^{-1}$ at 37°C . $-2.303RT = -1.42 \text{ kcal mol}^{-1}$. What is the equilibrium ratio of B/A?
17. The combination of bile salt binding resin and HMG-COA reductase inhibitor is very effectively used in reducing serum cholesterol for most patients with high cholesterol. Why is this treatment much less effective for patients with familial hypercholesterolemia?