



Register Number:
Date: / / 2019

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27
M.Sc. Chemistry - III SEMESTER
SEMESTER EXAMINATION: OCT 2019
CH9118– BIOLOGICAL CHEMISTRY

Time - 2 ½ Hours

Max Marks - 70

This paper contains 2 printed pages and three parts
Total numbers of questions are 17.

Part A

Answer any **SIX** of the following:

[6 X 2 = 12]

1. What is cytochrome P₄₅₀? Give the reaction it is involved in?
2. What is meant by active and passive transport across biological membrane?
3. Explain any two types of forces that are seen in the biological system.
4. How is NO synthesized? What is its physiological role?
5. What do you mean by ionophore? Write the structure of one naturally occurring ionophore.
6. Give one method by which an endergonic process occurs spontaneously in the cell.
7. What is the role of Mn-protein complex in electron transport process of photosynthesis?
8. Name one enzyme that regulates gluconeogenesis pathway and write the biochemical reaction involved in it?

Part B

Answer any **FOUR** of the following:

[12 X 4 = 48]

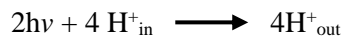
9. a) Draw the flow chart indicating the function of photosystem I and II.
b) What do you mean by cooperative interaction in O₂ affinity of haemoglobin? How do you express the phenomenon by Hill equation and Hill Plot?
10. a) Explain the mechanism of action of chymotrypsin enzyme.
b) Write a note on post translational modification of proteins.
11. a) Draw the structure of crown ethers that specifically bind to K⁺ and Na⁺
b) Explain briefly how termination occurs during the protein biosynthesis.
12. a) How is cholesterol biosynthetic pathway regulated?
b) What is the mechanism for the conversion of pyruvate to acetyl phosphate by a TPP dependent decarboxylase?
13. a) Write a biochemical reaction which involves the following coenzymes
i) coenzyme A ii) Pyridoxal phosphate iii) FAD
b) Give a schematic diagram for the conversion of superoxide anion to hydrogen peroxide by Zn-Cu dependent superoxide dismutase.
14. a) Briefly describe the mechanism of storage and transport of iron in higher animals.
b) State the role of the following metal ions in biological system i) copper ii) Zinc iii) Cobalt
iv) Manganese v) Iron vi) Molybdenum

Part C

Answer any **TWO** of the following:

[2 X 5 =10]

15. Plastoquinone oxidation by cytochrome bc_1 and cytochrome b_6f complexes apparently leads to the translocation of $4H^+/2e^-$. If E_o' for cytochrome $b_6f = 0.365V$ and E_o' , for $PQ/PQH_2 = 0.07V$, Calculate the ΔG for the coupled reaction:



Assume a value 25 kJ/mol for the free energy change associated with moving protons from inside to outside ($1F = 96500 \text{Coulomb}$).

16. Name any two forces of interaction that are involved in stabilizing the structure of
i) Proteins ii) Nucleic acids iii) Carbohydrates in the biological system.
17. Predict the v versus $[S]$ plot for fructose-1,6-bisphosphatase in the presence and absence of fructose-2,6-bisphosphate assuming fructose-2,6-bisphosphate is a (a) competitive inhibitor (b) Uncompetitive inhibitor. How are the K_m and V_{max} values affected?
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