



Date:

Registration number:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27
B. Sc. CHEMISTRY - VI SEMESTER
SEMESTER EXAMINATION: APRIL 2023
 (Examination conducted in May 2023)
CH 6218 - BIOCHEMISTRY

Time: 2½ hours

Max. Marks: 70

Note: This question paper has two pages and three parts
 Give structures and chemical reactions wherever necessary

PART A

Answer any **SIX** of the following:

2 X 6 = 12

1. What is the reason for the selection of carbon over silicon in biological system.
2. Give one example for each of the following enzymes (i) oxidoreductase (ii) transferase
3. What is substrate level phosphorylation.
4. Differentiate between catabolism and anabolism.
5. What is anaerobic glycolysis.
6. What is the importance of urea cycle?
7. What does cAMP stand for? What is its role in biological system
8. What is the semiconservative mode of DNA replication.

PART B

Answer any **EIGHT** of the following:

6 X 8 = 48

9. (a) Draw the partial structure of amylopectin of starch. How does it differ from glycogen
 (b) Explain the phenomenon "mutarotation". (3+3)
10. (a) Mention the biological importance of phospholipids.
 (b) Draw the structures of the following fatty acid. Identify the omega-3 fatty acid.
 (i) 18:3^{Δ9,12,15}; (ii) 20:4^{Δ5,8,11,14} (3+3)
11. (a) Give the reaction of peptide with Sanger's reagent. What is the importance of this reaction?
 (b) Give an example for each of the following class of proteins (i) structural (ii) storage and (iii) transport. (3+3)
12. (a) Mention the important features of active site of an enzyme.
 (b) Give examples for each of the following type of enzyme specificity; (i) broad specificity (ii) Cis/trans specificity (iii) D/L specificity. (3+3)

13. (a) How does temperature affects the kinetics of an enzymatic reaction. Explain
 (b) Mention the significance of K_m and V_{max} . of an enzymatic reaction. (3+3)
14. (a) Explain reversible competitive enzyme inhibition with an example.
 (b) Define P/O ratio. The P/O ratio of 2.5 for NADH, and 1.5 for $FADH_2$. Explain. (3+3)
15. Give the reactions catalysed by the following enzymes
 (i) Hexokinase, (ii) Phospho gluco isomerase (iii) Phosphofructo kinase
16. β -Oxidation of fatty acyl CoA in the mitochondria involves four steps which are repeated.
 Give these four reactions.
17. (a) Draw the structure of ATP and number the carbon atoms of sugar unit.
 (b) What does it mean that DNA strands are antiparallel and complementary? (3+3)
18. Explain briefly the role of the following enzymes in the process of DNA replication.
 (i) helicase, (ii) DNA polymerase, and (iii) ligase.

PART C

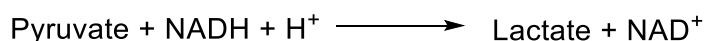
Answer any TWO of the following:

5 X 2 = 10

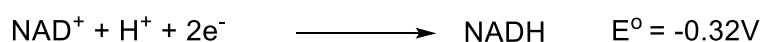
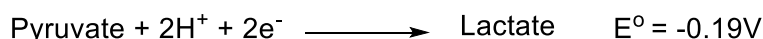
19. (a) A nonreducing disaccharide on hydrolysis produced glucose as the only monosaccharide unit. Draw the structure of the disaccharide.
 (b) Identify the oil having longer fatty acid and more unsaturation.

<u>Name of the oil</u>	<u>SAP No.</u>	<u>Iodine No.</u>	
Coconut Oil, Organic	250 - 265	10.5	
Mustard Oil	172	107	
Olive Oil	194	94	
Peanut Oil	184	86	(3+3)

20. The pI of cysteine is 5.02. Draw the structures of cysteine at (i) pH = 3.52, (ii) pH = 9.34 and (iii) pH = 5.02.
22. Calculate ΔG^0 for the following reaction.



The half-cell reactions are



$$\text{Faradays constant} = 9.65 \times 10^4 \text{ C mol}^{-1}$$