FIVE YEAR INTEGRATED M.Sc. EXAMINATION, 2023
SEMESTER - V
Paper LS-3-5-2
(Life Science: Metabolism of Carbohydrates, Proteins, Lipids and Nucleic acids)

Time: 4 hours **Full Marks: 80**

Questions are of value as indicated in the margin.
*Answer **Question No. 1** and **any six** from the rest.*

1. Answer ***any ten*** of the following: 10x2=20

    a. What are dehydrogenases? Give two examples.
    b. What do you mean by phosphorolysis?
    c. Which is the principal regulatory enzyme of glycolysis? Why?
    d. What is debranching enzyme?
    e. How does carnitine shuttle function?
    f. What is MUFA? Give an example.
    g. Which steps of citric acid cycle release CO_2?
    h. What is alkaptonuria?
    i. What is the consequence of higher circulating levels of uric acid?
    j. State the functions of bile salts.
    k. What are microvilli?
    l. Give an example of a transamination reaction.

2. What is glycogenin? How is UDP-glucose formed? Explain the catalytic action of glycogen synthase. How are the branches created in a glycogen molecule? 2+2+3+3=10

3. Write the reactions of glycolysis. What is the net yield of ATP from glycolysis? Which glycolytic reactions cannot occur in gluconeogenic pathway? Mention the alternate gluconeogenic enzymes that catalyze these reactions. 5+1+1+3=10

4. Discuss the processes of lactic acid fermentation and alcoholic fermentation. What is the metabolic fate of pyruvate in aerobic conditions? Explain the catalytic mechanism of pyruvate dehydrogenase complex. (2+2)+1+5=10

5. What are the points of entry of electrons in the electron transport chain? How is proton gradient formed? Elaborate the process of electron flow through mitochondrial Complex I and Complex II. 1+2+(4+3)=10

6. Why is aerobic metabolism more efficient than anaerobic metabolism? What are uncouplers? Give two examples of chemical uncouplers and mention their mode of action. State the biological significance of UCP1 protein. 2+2+3+3=10

7. How are fatty acyl-CoA formed? Compare the mitochondrial and peroxisomal oxidation of fatty acids. Give a summary of the *de novo* pathway of nucleotide biosynthesis. 2+3+5=10

8. Elaborate the processes of digestion and absorption of proteins in the human digestive system. (6+4)=10

9. With a schematic diagram, describe the urea cycle. What are glucogenic and ketogenic amino acids? 8+2=10
