U.G. 6th Semester Class test (NEP)
Department of Zoology
Raghunathpur College
Course Title: Biochemistry
Course code –BZOOMAJ09C (Major)

Full Marks: 60 **Time: 3 hours**

1. **Answer any ten questions from the following: 2×10=20**
    a) Why TCA cycle is amphibolic in nature?
    b) Calculate the number of ATP molecules formed during complete oxidation of one molecule of glucose under aerobic condition.
    c) What are allosteric enzymes?
    d) What is the significance of Km?
    e) What is proton-motif force?
    f) Define glucogenic and ketogenic amino acids with example.
    g) Name the rate limiting enzymes of gluconeogenesis.
    h) How does substrate level phosphorylation differ from oxidative phosphorylation?
    i) What is redox potential?
    j) Explain why amino acids are considered zwitterions.
    k) What is PUFA? State its significance.
    l) Name four types of bonds found in the tertiary structure of protein.
    m) Differentiate between fibrous and globular protein
    n) Define the dihedral angles Phi and Psi. Between which atoms are these angles measured in a peptide backbone?
    o) Define holo enzyme, iso-enzyme, co-enzyme and prosthetic group.

2. **Answer any six questions from the following: 5×6= 30**
    a. Write a short note on protein stability and factors affecting it.
    b. What is beta oxidation? Briefly describe mitochondrial beta oxidation of fatty acids? 1+4
    c. Derive the Lineweaver Burk plot from the Michaelis-Mneten equation?
    d. Explain competitive and non-competitive enzyme inhibition.
    e. Derive the Michaelis-Menten equation. Name two inhibitors of the respiratory chain and cite their respective locations. 3+2
    f. What are haemoproteins? Give example. Draw structure of heme. 2+1+2
    g. Discuss why Glycine and Proline are considered "exceptions" in a Ramachandran Plot. In a Ramachandran Plot, which regions correspond to the following secondary structures? 1. Right-handed alpha-helix 2. **B**eta-pleated sheets (parallel and antiparallel) 3. Left-handed alpha-helix 2 +3
    h. Describe the effect of pH and temperature on enzyme activity. 2.5+2.5
    i. What happens when [S]>>Km, [S]=Km and [S]<<Km?

3. Answer any one question from the following: 1×10=10

a) Describe the structural organization of proteins and explain how folding determines protein function. 4+6

b) Write down the chemiosmotic theory of ATP production. What is ATP synthase? Describe its structure and its different conformational states. 5+2+3

c) Explain the TCA cycle in detail with a neat labeled diagram which include: Steps of the cycle, Enzymes involved, Formation of NADH, $FADH_2$, CO_2 and ATP/GTP.