November 2025
M.Sc.
First Semester
CORE – 02
ZOOLOGY
Course Code: MZOC 1.21
(Biochemistry)

Total Mark: 70   *Pass Mark: 28*
Time: 3 hours

Answer <u>five</u> questions, taking <u>one</u> from each unit.

UNIT–I

1. (a) Derive the Henderson-Hasselbalch equation and express the equation if $\left[A^- \right] = \left[HA \right]$.   10

    (b) A buffer solution is prepared by mixing 0.15 M ammonia (NH_3) and 0.10 M ammonium chloride (NH_4Cl). The pKa of ammonium ion (NH_4^+) is 9.25. Calculate the pH of the buffer. 4

2. Elaborate on the role of coupled reactions and standard reduction potential in bioenergetics. Add a note on oxidation phosphorylation.
                                                                      10+4=14

UNIT–II

3. Give an account of gluconeogenesis and its regulation.   10+4=14

4. Explain the process of glycolysis. Add a note on the roles of enzymes involved in it.   10+4=14

UNIT–III

5. Describe the chemical structure of amino acids. Elaborate on the chemical and physical properties of amino acids.   8+6=14

6. Write a note on each of the following: 7×2=14
    (a) Urea cycle
    (b) Oxidative and non-oxidative deamination

UNIT–IV

7. Explain the four levels of protein structure. Add a note on the bonds involved in protein organisation.   10+4=14

8. Write a note on each of the following: 7×2=14
   (a) Salvage pathway of ribonucleotide synthesis
   (b) Degradation of nucleotides

UNIT–V

9. Give an account of the integration of major metabolic pathways of energy metabolism.   14

10. Write a note on each of the following: 7×2=14
    (a) Role of skeletal muscles in integrated metabolism
    (b) Intermediary metabolites

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