

2025

M.Sc. 1st Semester Examination

BIOCHEMISTRY

Paper : BICE404A0

(Human and Plant Physiology)

Full Marks : 50

Time : Two Hours

The figures in the margin indicate full marks.

*Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any *four* questions : $2 \times 4 = 8$

1. What is meant by secondary metabolites?
2. Define action potential. Mention the threshold stimulus required for its initiation.
3. Explain in brief the role of counter current mechanism in the production of hypotonic urine.
4. How does the cytochrome b_6f complex contribute to ATP synthesis?
5. Photorespiration is often described as a "Wasteful" process. Justify the statement.

P.T.O.

(2)

6. What do you mean by systemic acquired resistance (SAR) in plant stress defence mechanism?

Group - B

Answer any *four* questions : $4 \times 4 = 16$

7. Explain the generation of S_1 and S_2 heart sounds, linking to specific phases of ventricular systole and diastole.
8. Explain the role of central and peripheral chemoreceptors in maintaining respiratory homeostasis.
9. Compare the differing capacities for neuroplasticity and neuroregeneration between CNS and PNS.
10. Differentiate the C_3 and C_4 pathways.
11. Discuss the role and significance of the alternative oxidase (AOX) in plant mitochondria.
12. How shikimate and malonate pathway integrate primary metabolism intermediates to produce plant phenols?

Group - C

Answer any *two* questions : $8 \times 2 = 16$

13. Discuss briefly the concept of energy balance in human body. Critically evaluate the factors influencing BMR. Write short notes on estimation methods of limitation of common BMR.
- $2+3+3$

(3)

14. Explain the intricate hormonal regulation of ovulation. Discuss the roles and molecular mechanism of GnRH hormone involved in follicular rupture. 3+5
15. Describe the molecular mechanism of action of Auxin and Gibberellin. Emphasize the role of protein degradation pathways and transcriptional regulation in their respective signalling cascade. 3+5
16. Discuss the mechanism of phloem loading and unloading contrasting apoplastic and symplastic pathways. Mention the roles of active transport, sucrose transporters and pressure flow hypothesis during this movement. 3+5

Internal Assessment : 10 marks
