6. (a) Explain adaptive radiation with special reference to Galapagos finches. 8

(b) What is multiple sequence alignment ? Explain its role in phylogenetic analysis. 7

7. (a) Discuss the origin and evolution of humans from early primates to Homo sapiens. 10

(b) Elaborate UPGMA and Neighbor Joining methods of phylogenetic tree construction. 5

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757408

May 2026

M. Sc. (Zoology) (Fourth Semester)

Evolutionary Biology (MZO-403)

Time : 3 *Hours*] [*Maximum Marks :* 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) What is the RNA world hypothesis ? 1.5

(b) State one major difference between Lamarckism and Darwinism. 1.5

(c) What is neutral theory of molecular evolution ? **1.5**

(d) State the Hardy-Weinberg law. **1.5**

(e) What is bottleneck phenomenon ? **1.5**

(f) Define heterozygote superiority. **1.5**

(g) What is adaptive radiation ? **1.5**

(h) Differentiate background extinction from mass extinction. **1.5**

(i) What is molecular analysis in human origin studies ? **1.5**

(j) State the significance of phylogenetic trees. **1.5**

Part B

2. (a) Explain the geological time scale and its significance in understanding evolutionary history. **10**

(b) Illustrate the origin and significance of photosynthesis in early evolution. **5**

3. (a) Describe molecular clock theory and discuss examples from globin gene family and *r*RNA/cytochrome c studies. **8**

(b) Discuss kin selection and adaptive resemblance in evolutionary biology. **7**

4. (a) Discuss the evolutionary forces that disturb Hardy-Weinberg equilibrium. **8**

(b) What is density-dependent selection ? Discuss its ecological significance. **7**

5. (a) Explain microevolutionary changes with reference to inter-population variation, clines and races. **10**

(b) Discuss the role of speciation in generating biodiversity. **5**