

Question Bank in accordance to Open book Format
B.Sc.(H) Zoology
Semester VI
Evolutionary Biology

1. If the albino phenotype occurs in 1/10,000 individuals in a population at equilibrium and albinism is caused by an autosomal recessive allele 'a', calculate the (a) recessive mutant allele (b) the normal dominant allele (c) heterozygotes in the populations. Hardy Weinberg is only applicable in an ideal case scenario. However, the real human population is far from the idealistic principles. Why is then the study of Hardy-Weinberg in human population significant?
2. Peter and Rosemary Grant spent 40 years of their life studying evolution in Darwin's finches in the 'Nature's laboratory' i.e. Galapagos island. During their stay on Daphne Major they observed several cases of deviation in the local weather which affected the population of finches. The year 1977 was hit by severe draught resulting in reduction in the population of *Geospiza fortis*. The females died at a higher rate than males. The surviving population of individuals were comparatively larger in size (beak and body both). The differential mortality during drought the *G. fortis* born in 1978 were about 4 % larger than the average *G. fortis* population. Explain the phenomenon occurring at each step in details. Support your answer with graphs (The average beak depth of *G. fortis* in 1976 was 9.5 mm).
3. It is said that when life originated on earth the genetic material was made up of RNA. Cite reasons for precedence of RNA over DNA and protein as the genetic world. Later RNA gave way to DNA. Discuss the advantages DNA today has over RNA as the genetic material.
4. The virus- human immunodeficiency virus infects human and causes AIDS, has an RNA genome. Drugs like 3TC have been used in cure of AIDS but have proven to be unsuccessful. Explain evolution occurring at molecular level.
5. Differentiate between Batesian and Mullerian mimicry. Why are mimics known as 'copycats or pretenders to the throne'. Explain with examples from nature. Also state where are these mimics most successful.
6. Use the phylogenetic tree below to chart out the evolution of globin genes.

