

CORE-XIV (EVOLUTIONARY BIOLOGY)

Answer the following questions [1]

- I. **The force that initiates evolution is _____**
 - a. Variation
 - b. Mutation
 - c. Extinction
 - d. Adaptation
- II. **_____ is a vestigial organ**
 - a. Intestinal villi
 - b. Papillae
 - c. Vermiform appendix
 - d. None of the above
- III. **The earliest geological time period among the following is _____**
 - a. Cambrian
 - b. Permian
 - c. Jurassic
 - d. Quaternary
- IV. **The experiment that simulated conditions thought to be present on the early earth**
 - a. Hershey–Chase experiment
 - b. Geiger–Marsden experiment
 - c. Miller–Urey experiment
 - d. Schiehallion experiment
- V. **Example of a homologous organ**
 - a. The arm of a human, wing of a bird
 - b. Wing of an insect, wing of a bird
 - c. Leg of a dog, leg of a spider
 - d. None of the above
- VI. **Primordial soup is a set of hypothetical conditions on ancient earth first proposed by _____**
 - a. Dmitri Ivanovsky
 - b. Alexander Oparin
 - c. Dmitry Anuchin
 - d. Nikolay Shatsky
- VII. **Which condition can be explained by Lamarckism?**
 - a. How giraffes got their long neck

- b. How humans lost their tail
 - c. How humans became bipedal
 - d. All of the above
- VIII. **Observation of species on _____ heavily inspired Darwin's theory of evolution.**
- a. Ilha da Queimada Grande
 - b. Guatemala
 - c. Faroe Islands
 - d. Galapagos Islands
- IX. _____ was considered as a missing link between reptiles and birds.
- a. Archaeopteryx
 - b. Pteranodon
 - c. Avimimus
 - d. Caudipteryx
- X. **The oldest mineral discovered so far was _____, which dates back to 4.4 billion years.**
- a. Iron
 - b. Zircon
 - c. Cadmium
 - d. Silicon
- XI. **Pidgeon, platypus and panda are _____**
- a. Homeothermic
 - b. Poikilothermic
 - c. Hyperthermic
 - d. None of the above
- XII. **The last common ancestor of humans is**
- a. Pan troglodytes
 - b) Homo neanderthalensis
 - c) Lemuroidea
 - d) Dromaeosaurus
- XIII. **An example of convergent evolution is**
- a. Wing of Hawkmoths, the wing of hawks
 - b. Teeth of domestic dog, teeth of a wolf
 - c. Wings of Geospiza magnirostris, wings of Geospiza fortis
 - d. None of the above
- XIV. **On the Origin of Species was written by _____**

- a. Charles Darwin
- b. Ludmila Kuprianova
- c. Mikhail A. Fedonkin
- d. None of the above

XV. When did dinosaurs die off?

- a. 105.1 million years ago
- b. 65.5 million years ago
- c. 75.5 million years ago.
- d. None of the above

Answer Key

1	a
2	c
3	a
4	c
5	a
6	b
7	d
8	d
9	a
10	b
11	a
12	a
13	a
14	a

Answer the following questions in 2-3 sentences. [1.5]

- 1) What is natural selection?
- 2) Give the concept of fitness.
- 3) What is selection coefficient?
- 4) What is the selection of a dominant allele?
- 5) Give the derivation of one unit of selection for a dominant allele.
- 6) What is genetic load?
- 7) What are the types of selection?
- 8) State about density dependent selection.
- 9) What is heterozygous superiority?
- 10) What is kin selection?
- 11) Explain adaptive resemblances.
- 12) What do you mean by sexual selection.
- 13) Give a brief account on founder's effect.
- 14) Give an account on bottleneck phenomenon.
- 15) Define clines.
- 16) Define races.

Answer the following questions in 75 words. [2]

- 1) What do you mean by chemogeny and biogeny?
- 2) What do you understand by RNA world?
- 3) What is Lamarckism?
- 4) Write a short note on Darwinism.
- 5) Explain about Neo-Darwinism.
- 6) What are transitional forms?
- 7) State about geological time scale.
- 8) Differentiate between background and mass extinction.
- 9) What are the assumptions of Hardy-Weinberg law?
- 10) What are the evolutionary forces upsetting HW equilibrium?
- 11) Give the mechanism of genetic drift.
- 12) What is the role of migration and mutation in changing allele frequencies?
- 13) State about inter-population variations.
- 14) What is species concept?
- 15) State about isolating mechanisms.
- 16) Differentiate between allopatric and sympatric speciation.

Answer the following questions in 500 words [6]

- 1) State about chemogeny.
- 2) Give an account on origin of photosynthesis.
- 3) State about evolution of eukaryotes.
- 4) Give a detailed account on K-T extinction.
- 5) What are the different types of fossils?
- 6) Write a short note on evolution of horse.
- 7) State about heritable variations and their role in evolution.
- 8) Describe Hardy-Weinberg law.
- 9) What do you mean by adaptive radiation/macroevolution? Exemplify by Galapagos finches.
- 10) Give the origin and evolution of man.
- 11) State about unique hominin characteristics contrasted with primate characteristics.
- 12) Give an account on primate phylogeny from Dryopithecus leading to *Homo sapiens*.
- 13) Give the molecular analysis of human origin.
- 14) What are phylogenetic trees? Give the construction and interpretation of phylogenetic trees.
- 15) What do you understand by multiple sequence alignment?
- 16) Explain the different modes of speciation.