

2024

(NEP-2020)

(2nd Semester)

ZOOLOGY (MAJOR)

(Evolution and Ethology)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A—OBJECTIVE)

(Marks : 10)

Tick (✓) the correct answer in the brackets provided :

1×10=10

1. According to Charles Darwin, variations that are injurious or harmful to an organism

- (a) will be promoted by natural selection ()
- (b) will be ignored by natural selection ()
- (c) will be rejected by natural selection ()
- (d) can create new varieties, and therefore, new species ()

2. The major gene that contributes to high-altitude adaptation in the Tibetans is

- (a) HBB ()
- (b) EPAS1 ()
- (c) Cortex ()
- (d) FOXP2 ()

3. The concept of modern synthesis or population genetics is basically
- (a) Mendelian inheritance + artificial selection ()
 - (b) artificial selection + natural selection ()
 - (c) Malthusian theory of population + natural selection ()
 - (d) natural selection + Mendelian inheritance ()
4. According to the fossil record, the first humans to have moved out of Africa were
- (a) *Australopithecus afarensis* ()
 - (b) *Homo erectus* ()
 - (c) *Ardipithecus ramidus* ()
 - (d) *Homo habilis* ()
5. There are five distinct genomes inside the cell of
- (a) *Mixotricha paradoxa* ()
 - (b) *Angomonas deanei* ()
 - (c) *Biston betularia* ()
 - (d) *Plasmodium falciparum* ()
6. A behaviour is strictly determined and regulated by genes in case of
- (a) aggressive behaviour ()
 - (b) imprinting ()
 - (c) innate behaviour ()
 - (d) operant behaviour ()
7. Aposematism is a behaviour that is used as a
- (a) warning display to predators ()
 - (b) hiding method from predators ()
 - (c) hunting tactics for catching prey ()
 - (d) lure to attract prey ()

8. The use of low-frequency sound (<20 Hz) in animal communication is called
- (a) SONAR ()
 - (b) echolocation ()
 - (c) ultrasound ()
 - (d) infrasound ()
9. Flight or fight hormones are
- (a) melatonin and oxytocin ()
 - (b) testosterone and estrogen ()
 - (c) adrenalin and noradrenalin ()
 - (d) progesterone and estrogen ()
10. In waggle dance of bees, distance of the food source is represented by the
- (a) duration of the waggle phase ()
 - (b) direction of the waggle phase ()
 - (c) position of the sun ()
 - (d) intensity of the waggle motions ()

(SECTION : B—SHORT ANSWERS)

(Marks : 15)

Write notes on *five* of the following, taking at least *one* from each Unit : $3 \times 5 = 15$

UNIT—I

- 1. Kettlewell's experiment
- 2. Postulates of gradualism and universal ancestry

UNIT—II

- 3. Salient points of the RNA world hypothesis
- 4. Extinct *Homo* species

UNIT—III

- 5. Camouflage
- 6. Altruism

UNIT—IV

7. Echolocation in toothed whales
8. Sex steroids

(SECTION : C—DESCRIPTIVE)

(Marks : 50)

Answer five of the following, taking at least one from each Unit :

10×5=50

UNIT—I

1. Explain how sickle-cell trait is developed and its influence on humans in malaria endemic regions.
2. Give an account on prebiotic soup theory and the experimental evidence supporting it.

UNIT—II

3. Write an essay on out of Africa theory based on mitochondrial Eve and Y-chromosomal Adam concepts.
4. Describe the development and features of symbiogenesis with an emphasis on *Angomonas deanei* as an example.

UNIT—III

5. Compare and contrast the elements of imprinting and classical conditioning.
6. Discuss the central concepts of Batesian and Mullerian mimicry.

UNIT—IV

7. Describe the phenomenon of evolutionary arms race, elaborating it with an example between any two animals.
8. Explain the hormonal basis of sex change in animals. How can humans artificially change their sexes?

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