

E- 784
M. Sc. (Third Semester)
EXAMINATION, DEC.-JAN.- 2020-21
ZOOLOGY
Paper Fourth
(Population Genetics and Evolution)

Time : Three Hours }

{ Max. Marks : 80

Note :- Attempt all section as directed

Section—A
(Objective type/MCQ)

Tick the correct answer-

01 mark each

- 1) “Continuity of Germplasm” theory was given by -
 - a. De Vries
 - b. Weismann
 - c. Darwin
 - d. Lamarck.

- 2) Which of the following are homologous organs?
 - a. Wings of bird and hands of human
 - b. Nails of human being and claws in animals
 - c. Wings of bird and wings of insect
 - d. Wings of bat and wings of cockroach.

- 3) Which of the following evidences does not favor the Lamarckian concept of inheritance of acquired characters?
 - a. Lack of pigment in cave-dwelling animals
 - b. Melanization in peppered moth
 - c. Absence of limbs in snakes
 - d. Presence of webbed toes in aquatic birds.

- 4) Which one of the following are analogous structures?
- Wings of bat and wings of pigeon
 - Gills of prawn and lungs of man
 - Thorns of Bougainvillea and tendrils of Cucurbita
 - Flippers of dolphin and legs of horse
- 5) Theory of Natural Selection dwells on
- Role of environment in evolution
 - Natural selection acting on favourable variations
 - Changes in gene complex resulting in heritable variations
 - None of the above.
- 6) Genetic drift is change of
- Gene frequency in same generation
 - Appearance of recessive genes
 - Gene frequency from one generation to next
 - None of the above.
- 7) Which statement best describes the Hardy-Weinberg principle?
- Recessive alleles eventually disappear in large populations.
 - When a population is large, the allele frequency will change over time.
 - Dominant alleles become more prevalent in large populations.
 - When there is a large population, the mechanism of inheritance does not change allele frequencies.
- 8) At a particular locus, frequency of 'A' allele is 0.6 and that of 'a' is 0.4. What would be the frequency of heterozygote's in a random mating population at equilibrium?
- 0.36
 - 0.16
 - 0.24
 - 0.48.

- 9) In a species' population, stabilizing selection acts to -
- a. Push for directional change
 - b. Alter traits
 - c. Elaborate new traits
 - d. Maintain a certain phenotype
- 10) The two key factors responsible for speciation among populations are:
- a. Mutation and heterozygote disadvantage
 - b. Reproductive isolation and genetic divergence
 - c. Postzygotic isolation and morphological change
 - d. Mutation and genetic drift
- 11) Which statement best represents the meaning of the term *evolution*:
- a. Changes in species toward greater complexity over time
 - b. Changes in gene frequencies in a population over time
 - c. The strongest individuals survive and produce the most offspring
 - d. Changes in an individual over time in response to natural selection
- 12) Which one below is NOT a reproductive isolating mechanism?
- a. Temporal
 - b. Behavioral
 - c. Ecological
 - d. Individual
- 13) Species occurring in different geographical area are called as-
- a. Sympatric
 - b. Allopatric
 - c. Sibling
 - d. Neopatric.
- 14) In which era reptiles were dominant?
- a. Coenozoic era
 - b. Mesozoic era

- c. Palaeozoic era
- d. Archaeozoic era.

- 15) Adaptive radiation refers to-
- a. Evolution of different species from a common ancestor
 - b. Migration of members of a species to different geographical areas
 - c. Power of adaptation in an individual to a variety of environments
 - d. Adaptations due to geographical isolation.
- 16) What was the most significant trend in the evolution of modern man (*Homo sapiens*) from his ancestors?
- a. Increasing brain capacity
 - b. Upright posture
 - c. Shortening of jaws
 - d. Binocular vision
- 17) Which statement best represents the meaning of the term *evolution*:
- a. Changes in species toward greater complexity over time
 - b. Changes in gene frequencies in a population over time
 - c. The strongest individuals survive and produce the most offspring
 - d. Changes in an individual over time in response to natural selection
- 18) Which of the following is an example of the bottle neck effect?
- a. Bald Eagles are hunted until near extinction, population recovers.
 - b. Small group of iguanas floats to an island, starts a new population.
 - c. Red fox pups are more likely to survive in a snowy environment if they are born white.
 - d. Farmer chooses seeds from largest apples to plant next year. This results in larger apples from year to year.

- 19) Slight genetic change over a few generations in a population that does not result in the evolution of a new species is:
- macroevolution
 - microevolution
 - evolutionary equilibrium
 - Mega evolution
- 20) Which one of the following was the first to start bipedal movement?
- Peking man
 - Australopithecus
 - Java man
 - Cro magnon man

Section—B

(Very short answer type)

02 marks each

Define the following (Not more than 2-3 lines)-

- 1) Organic Evolution
- 2) Gene flow
- 3) Gene pool
- 4) Sympatric population
- 5) Species
- 6) Micro evolution
- 7) Convergent evolution
- 8) Sewall Wright Effect

Section—C

(Short answer type)

03 marks each

Explain the following (Each in 40 -50 words approx)

- 1) Synthetic theory
- 2) Darwinism
- 3) Genetic drift

- 4) Bottle neck
- 5) Reproductive Isolating Mechanisms
- 6) Macroevolution
- 7) Group and kin selection
- 8) Phenotypic variation

Section—D
(Long answer type)

05 marks each

Answer the following (250 words approx)

- 1) What is “Decent with modification”? Give evidences from comparative anatomy and physiology.
OR
Discuss the various evidences of evolution from embryology and biochemistry.
- 2) What is the essence of Natural Selection? What are its various types? Give examples.
OR
Explain the Hardy Weinberg law of genetic equilibrium
- 3) Write notes on Species and speciation
OR
What is gene evolution? What are the various factors affecting human disease frequency
- 4) Write notes on Primate Evolution.
OR
Write an essay on Evolution of Mankind
