

# KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(4 Pages)

Reg. No:.....

Question Code: 26E00609

Course Code : 24UMZO41

UG Degree - End Semester Examinations, April 2026

Fourth Semester

B.Sc., ZOOLOGY

Genetics and Evolution

(For those who joined in July 2024 onwards)

Time : 3Hours

Maximum : 75 Marks

## PART - A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

- CO:1 1. Which Mendelian law is best demonstrated by a dihybrid cross?  
K:1 (a) Law of Dominance (b) Law of Segregation  
(c) Law of Independent Assortment (d) Law of Unit Characters
- CO:2 2. What is the phenotypic ratio for a dihybrid cross exhibiting  
K:1 dominant epistasis?  
(a) 9:3:3:1 (b) 9:3:4  
(c) 12:3:1 (d) 15:1
- CO:3 3. At which stage of the cell cycle are chromosomes typically  
K:1 visualized for karyotyping?  
(a) Prophase (b) Metaphase  
(c) Anaphase (d) Interphase
- CO:4 4. Haemophilia is inherited as a:  
K:2 (a) Autosomal dominant trait (b) Autosomal recessive trait  
(c) X-linked dominant trait (d) X-linked recessive trait
- CO:5 5. "Black Urine Disease" is a common name for which metabolic  
K:1 disorder?  
(a) Maple Syrup Urine Disease (b) Alkaptonuria  
(c) Homocystinuria (d) Tay-Sachs Disease

- CO:1 6. In eukaryotes, the coding sequences of a gene are called:  
K:2 (a) Introns (b) Exons  
(c) Regulatory sequences (d) Repetitive DNA
- CO:2 7. Name the book in which Lamarck's theory of evolution was  
K:1 published.  
(a) Origin of Species (b) Philosophie Zoologique  
(c) Systema Naturae (d) The Descent of Man
- CO:4 8. Living fossils provide evidence for evolution by showing:  
K:2 (a) High rates of mutation (b) Evolutionary stasis  
(c) Rapid speciation (d) Convergent evolution
- CO:5 9. Genetic drift operates only in:  
K:2 (a) Large isolated populations (b) Small isolated populations  
(c) Fast-growing populations (d) Mendelian populations
- CO:5 10. Which type of mimicry is used by a predator to lure or approach  
K:1 its prey without being detected?  
(a) Protective mimicry (b) Batesian mimicry  
(c) Aggressive mimicry (d) Conscious mimicry

**PART - B (5 X 5 = 25 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 250 words.**

- CO:2 11. (a) Explain the mechanism of sex determination in humans.  
K:2 **(OR)**  
(b) Illustrate the process of cytoplasmic inheritance in *Paramecium*.
- CO:3 12. (a) Organize the different types of chromosomal aberrations.  
K:3 **(OR)**  
(b) Analyse the principles and significance of chromosome mapping.
- CO:4 13. (a) Examine the functional roles of various enzymes involved in  
K:4 DNA replication.  
**(OR)**

(b) Analyse the regulation of gene expression in prokaryotes using the Lac Operon model as an example.

CO:4 14. (a) Explain the essential criteria and conditions for fossilization  
K:5 to occur.

**(OR)**

(b) Justify how does the Urey-Miller experiment provide evidence for the chemical origin of life?

CO:5 15. (a) Examine the various evolutionary factors that affect Hardy-  
K:4 Weinberg equilibrium.

**(OR)**

(b) Classify the different types of isolating mechanisms that prevent interbreeding.

**PART - C (5 X 8 = 40 Marks)**

**Answer ALL Questions choosing either (a) or (b).**

**Answer should not exceed 500 words.**

CO:2 16. (a) Explain complementary genes with a suitable example.

K:5

**(OR)**

(b) Determine the genetic maternal effect in shell coiling of *Limnaea*.

CO:3 17. (a) Categorize the various types of mutagens and the resulting  
K:4 mutations.

**(OR)**

(b) Examine the mechanism of crossing over and its types.

CO:3 18. (a) List the Eugenics (positive/negative) and Euthenics as  
K:4 measures to improve mankind.

**(OR)**

(b) Analyse the different DNA repair mechanisms.

CO:4 19. (a) Appraise the Darwinian theory of Natural Selection

K:5

**(OR)**

(b) Assess the Geological Time Scale by detailing the major Eras, Periods and Epochs.

CO:5 20. (a) Compile a detailed report on the different modes of  
speciation.

- (b) Elaborate on the phylogeny of the horse based on the fossil evidences.