 

| **ST. JOSEPH’S UNIVERSITY, BANGALORE-27** | | | | | | | |  |
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| **M.Sc. ZOOLOGY - II SEMESTER** | | | | | | | |  |
| **SEMESTER EXAMINATION: APRIL 2023**  **(Examination conducted in May 2023)** | | | | | | | |  |
| **ZO 8222- DEVELOPMENTAL AND EVOLUTIONARY BIOLOGY**  **(For current batch students only)** | | | | | | | |  |
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| **Time- 2 hrs** | |  | **Max Marks-50** | | | |  |  |
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| **This paper contains 2 printed pages and four parts** | | | | | | | |  |

**Note: Draw neat labelled diagrams wherever necessary**

**Indicate the question numbers clearly.**

**PART A**

**Answer ALL questions: 5X1 = 5**

1. The capacity of the tissue to respond to a determinative stimulus is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. In genomic imprinting, the addition and removal of \_\_\_\_\_\_\_\_\_\_\_ can be used to control the activity of genes.
3. The \_\_\_\_\_\_\_\_\_\_\_ principle states that allele and genotype frequencies in a population will remain constant from generation to generation in the absence of other evolutionary influences.
4. Neutral \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ are the key components of the neutral theory of molecular evolution.
5. Mutations in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ gene can cause a genetic condition called synpolydactyly in humans.

**PART B**

**Answer ALL questions: 5x2 = 10**

1. Write a short note on Sonic hedgehog.
2. What are the two main mechanisms used for establishing commitment?
3. List the classes and sub-classes of genes involved in the formation of the anterior-posterior axis in *Drosophila*?
4. List the kinds of regulatory variations generated in eukaryotes.
5. A very slightly advantageous allele arises in a population (size 20). What is the likely fate of this allele?

**PART C**

**Answer ANY THREE of the following: 3X5 = 15**

1. With a neatly labelled diagram explain the process of neurogenesis.
2. Explain the role of the Thyroid hormone in Amphibian development.
3. Discuss reproductive isolating mechanisms that have evolved in sympatric animals, with suitable examples.
4. What is the molecular clock and what can it be used for?

**PART D**

**Answer ANY TWO of the following: 2X10 = 20**

1. The Homeotic genes are the master regulator genes controlling the development of whole-body segments or structures. How are they turned on and how do mutations affect the development, explain with examples.
2. With a neatly labelled diagram, explain the process of blastocyst formation in mammals. Add a note on the extraembryonic membranes and their functions.
3. How did limbless animals descend from typical tetrapods with four limbs?

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