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25-ZO-44-B

**M.Sc. IV SEMESTER [MAIN/ATKT] EXAMINATION
MAY - JUNE 2025**

ZOOLOGY

Paper - IV
[Cell Biology]

[Max. Marks : 75]

[Time : 3:00 Hrs.]

[Min. Marks : 26]

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt all five questions. Each question carries an internal choice.
Each question carries **15 marks**.

- Q. 1** How does DNA methylation affect gene expression and what role does it play in epigenetic regulation ?

OR

What is hetero chromatin, how is it organized within the nucleus, and why is it significant for genome stability and gene regulation ?

- Q. 2** What are gene mutations, and what molecular mechanisms are involved in the occurrence of mutations and their subsequent repair in the cell ?

OR

Describe the organization of the eukaryotic transcriptional machinery and explain the roles of its major components in the regulation of gene expression.

- Q. 3** Describe the process of eukaryotic translation and discuss the key mechanisms by which it is regulate at the initiation, elongation and termination stages.

OR

What is the molecular basis of thalassemia, and how do specific gene mutations affect the synthesis of hemoglobin subunits ?

- Q. 4** What is DNA rearrangement and how does it contribute to genetic diversity and specific cellular functions ?

OR

What are the molecular and cellular mechanisms underlying ageing and senescence, and how do they contribute to age related physiological decline?

P.T.O.

Q. 5 Describe the process of cleavage and gastrulation during *Drosophila* development, and explain how these stages contribute to the establishment of the body plan.

OR

What is the basic organization of homeobox gene and how do they contribute to the regulation of development process in multi cellular organisms ?

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