

4. (a) Describe the lifecycle and industrial applications of *Saccharomyces cerevisiae*? (9)
- (b) Discuss the role of CPCSEA and its related regulatory bodies in research? (6)
5. (a) Explain the lytic and lysogenic cycles of bacteriophage lambda. Discuss the applications of lambda in molecular biology studies. (9)
- (b) What makes *Xenopus laevis* a useful model organism for development biology studies? (6)
6. Write short notes on any **three** of the following :
(5×3=15)
- (a) *Escherichia coli* genome database (EcoCyc)
- (b) Lemur/Rhesus monkey as a model organism for primate research
- (c) Role of *Mus musculus* as a model for human genetic disorders
- (d) *Lumbricus terrestris* as a bio-indicator for soil contamination and heavy metal toxicity
- (e) Significance of *Arabidopsis thaliana* as a model for plant molecular genetics

(500)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5171

J

Unique Paper Code : 2234000014

Name of the Paper : GE - Model Organisms in Research

Name of the Course : **GE-Zoology Theory Exam May-June 2025**

Semester : VI (NEP-UGCF)

Duration : 3 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Four** questions in all. Question No. 1 is compulsory.
3. Attempt **all** the parts of a question together.

1. (a) Define the following : (4)

(i) Dauer larva stage

P.T.O.

(ii) Polytene Chromosomes

(iii) Minimal medium

(iv) Transgenic Organism

(b) Fill in the blanks : (5)

(i) The first model organism to be completely sequenced was _____ in 1982.

(ii) _____ is the commonly used medium for *Escherichia coli*.

(iii) _____ is the main culture collection of *Drosophila melanogaster*.

(iv) _____ is an important tool for gene editing.

(v) The full form of EMBL-EBI is _____.

(c) True or false : (4)

(i) *Lumbricus terrestris* is commonly used to study plant-microbe interactions.

(ii) *Drosophila melanogaster* has a short life cycle, making it suitable for genetic mutant studies.

(iii) Tetrahymena shows nuclear dimorphism.

(iv) *Saccharomyces cerevisiae* is used in research because of its well-annotated genome and easy genetic manipulation.

(d) Expand the following : (2)

(i) ATCC

(ii) RNAi

(iii) GFP

(iv) TAIR

2. (a) Give the biology and lifecycle of *Caenorhabditis elegans*. Discuss its scientific contribution in research. (10)

(b) Give the significance of Zebrafish Information Network (Zfin). (5)

3. (a) Discuss the morphology, lifecycle and maintenance of *Drosophila melanogaster* cultures in laboratory? (10)

(b) With the help of suitable examples, differentiate between a model organism and an experimental organism and describe the distinguishing features of model organisms in research? (5)

P.T.O.