



# Indian Institute of Technology Bhilai

End-semester Exam May 2025

BML 101- Biology for Engineers

Duration: 3 hours

Maximum Marks: 50

Name:

Roll Number:

## Section A

1. Provide your answers in one word:

1 x 5 = 5

- (a) What phase of the cell cycle has the longest duration?
- (b) What is the name of the protein structure that holds homologous chromosomes together during meiosis?
- (c) Which stage of cell cycle does crossing-over occur during meiosis?
- (d) What is the pathological condition that occurs under uncontrolled cell division?
- (e) Name one stain that is used to stain chromosomes.

2. Comment briefly on the following:

1 x 5 = 5

- (a) Generation time in a growth curve
- (b) Polar bodies
- (c) DNA condensation
- (d) Reverse transcription
- (e) Central dogma

3. Define any five:

2 x 5 = 10

- (a) Fidelity of DNA replication
- (b) End replication problem
- (c) 7-methylguanine
- (d) RNA polymerase
- (e) Sister chromatids
- (f) Kinetochore

4. Provide a brief account on five of the following by using diagrams only:

5 x 3 = 15

- (a) Cell cycle
- (b) Translation initiation
- (c) Crossing over
- (d) Bacterial growth curve
- (e) Meselson and Stahl experiment
- (f) Clover leaf model of tRNA

## Section B

Answer three questions.

3 x 5 = 15

- 5. Draw prokaryotic replication bubble with correct labelling of essential components.
- 6. Briefly discuss steps of prophase-I.
- 7. Provide a brief description of telomere synthesis. Why is it crucial for organisms' survival?

8. What do you understand by: (1) wobble hypothesis (2) charging of tRNA.
9. What are the three modifications of newly synthesized eukaryotic messenger RNA?
10. Please comment on the statement: Alternative splicing provides an evolutionary advantage.

-- End of paper --