

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 4 – EXAMINATION – SUMMER 2026

Subject Code: 3140409

Date: 25/05/2026

Subject Name: Molecular Biology and Genetics

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1** (a) What are chromosomal disorders? Give two examples. **03**
(b) Describe sex-linked inheritance with one example. **04**
(c) Write the types and molecular causes of mutation. **07**
- Q.2** (a) Define gene, cistron, recon, and muton. **03**
(b) Compare autosomal and sex-linked inheritance. **04**
(c) Analyze evidence proving DNA as genetic material. **07**
- OR
- Q.2** (c) Analyze linkage and crossing over with a suitable example. **07**
- Q.3** (a) Analyze role of pleiotropy in genetic expression. **03**
(b) Describe Avery–MacLeod–McCarty experiment. **04**
(c) Compare features of genetic material in different organisms. **07**
- OR
- Q.3** (a) What are Okazaki fragments? **03**
(b) Describe function of DNA polymerase I and III. **04**
(c) Evaluate the function of enzymes in the replication. **07**
- Q.4** (a) Define promoter, enhancer, and silencer. **03**
(b) Discuss role of transcription factors. **04**
(c) Discuss mechanism of transcription in prokaryotes. **07**
- OR
- Q.4** (a) What is the role of RNA polymerase? **03**
(b) Explain splicing mechanism. **04**
(c) Analyze regulation of transcription in eukaryotic & prokaryotic cells. **07**
- Q.5** (a) What is degeneracy of the genetic code? **03**
(b) Discuss role of ribosomes in translation. **04**
(c) Describe complete mechanism of translation in prokaryotes. **07**
- OR
- Q.5** (a) Differentiate between transition and transversion mutations. **03**

(b) Define Wobble hypothesis.

04

(c) Analyze experimental evidence for deciphering genetic code.

07
