

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3160411

Date: 05/06/2026

Subject Name: Industrial Biotechnology

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) Define fermentation and list its component parts. **03**
(b) Explain historical development of fermentation industry. **04**
(c) Describe a typical fermentation process with a neat diagram. **07**
- Q.2** (a) Define primary screening of industrial microorganisms. **03**
(b) Explain media formulation and optimization. **04**
(c) Describe inoculum development and its importance in fermentation. **07**
- OR
- Q.2** (c) Explain strain improvement methods for industrial microorganisms. **07**
- Q.3** (a) Give two examples of primary metabolites. **03**
(b) Differentiate between primary and secondary metabolites. **04**
(c) Explain industrial production of antibiotics with suitable example. **07**
- OR
- Q.3** (a) List two examples of secondary metabolites. **03**
(b) Write short note on therapeutic enzymes. **04**
(c) Describe production of recombinant proteins in industrial biotechnology. **07**
- Q.4** (a) Define biosimilar product. **03**
(b) Explain stability testing of biotechnology products. **04**
(c) Discuss selection of analytical methods for product characterization. **07**
- OR
- Q.4** (a) Define product comparability in industrial biotechnology. **03**
(b) Write short note on release testing of biopharmaceuticals. **04**
(c) Explain lifecycle issues in analytical methods. **07**
- Q.5** (a) What is process validation? **03**
(b) Explain importance of process knowledge in validation. **04**
(c) Discuss general requirements of process validation. **07**
- OR
- Q.5** (a) Write short note on scope of process validation. **03**

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| (b) Explain types of process validation. | 04 |
| (c) Describe importance of commercial process validation in biotechnology industry. | 07 |
