

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

Subject Code: 3140410

Date: 16/06/2026

Subject Name: Immunology

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 innate immunity. **03**
(b) Differentiate between humoral and cell-mediated immunity. **04**
(c) Explain hematopoiesis and primary vs. secondary lymphoid organs. **07**
- Q.2** (a) Define adjuvants with example. **03**
(b) What are antigenic determinants on immunoglobulins? **04**
(c) Describe ABO blood group system and its immunological basis. **07**
- OR
- Q.2** (c) Explain organization and expression of immunoglobulin genes. **07**
- Q.3** (a) Define MHC and its function. **03**
(b) Differentiate between endogenous and exogenous antigen presentation. **04**
(c) Explain complement activation pathways. **07**
- OR
- Q.3** (a) List functions of cytokines. **03**
(b) Write short note on immune tolerance. **04**
(c) Discuss regulation of complement system and its deficiencies. **07**
- Q.4** (a) Define ELISA and brief it. **03**
(b) Differentiate between precipitation and agglutination reactions. **04**
(c) Explain monoclonal antibody production by hybridoma technology. **07**
- OR
- Q.4** (a) Define western blotting. **03**
(b) What is flow cytometry? **04**
(c) Explain applications of immunofluorescence and FACS. **07**
- Q.5** (a) Define hypersensitivity and its types. **03**
(b) Differentiate between active and passive immunization. **04**
(c) Explain different types of hypersensitivity reactions. **07**
- OR
- Q.5** (a) What is autoimmunity? Give example. **03**

(b) Write note on DNA vaccines.

04

(c) Explain different types of vaccines with examples.

07
