

Seat No./Enrollment No.: _____

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

Subject Code: 3162613

Date: 26/05/2026

Subject Name: Weathering of Rubber

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) List the primary environmental factors that contribute to the degradation of rubber products. **03**
 - (b) Explain the effect of temperature fluctuations on the physical properties of rubber. **04**
 - (c) Describe the effect of sunlight (UV radiation) on rubber materials. Explain the mechanism of degradation due to sunlight. **07**
- Q.2**
- (a) Define ionizing radiation and its basic effect on rubber molecules. **03**
 - (b) List any four causes of rubber product failure due to weather. **04**
 - (c) Explain how humidity leads to degradation of rubber products. **07**
- OR
- Q.2**
- (c) Describe the effects of fluids (gases, liquids, vapors) on rubber performance. **07**
- Q.3**
- (a) List the factors affecting thermal degradation of rubber. **03**
 - (b) Compare UV degradation and ozone degradation. **04**
 - (c) Compare the effects of mechanical stress and electrical stress on rubber failure. **07**
- OR
- Q.3**
- (a) Write the chemical effect of ozone on unsaturated rubber. **03**
 - (b) Explain the role of free radicals in degradation mechanism. **04**
 - (c) Discuss the role of bio-organisms in rubber degradation with examples. **07**
- Q.4**
- (a) Define the term “Acceleration factor” in weathering trials. **03**
 - (b) What properties are typically measured after artificial weathering tests on rubber? **04**
 - (c) Explain the concept of induction period in rubber degradation with suitable examples. **07**
- OR
- Q.4**
- (a) What do you mean by Artificial Weathering? Justify its importance. **03**
 - (b) Compare the natural Vs Artificial Weathering. **04**
 - (c) Explain different artificial light sources used in weathering tests. **07**
- Q.5**
- (a) Define specialty rubbers. Give one example. **03**
 - (b) Describe the weathering behavior of natural rubber. **04**

(c) Discuss all major property changes in rubber due to ageing and weathering with examples. **07**

OR

- Q.5**
- (a)** Name two synthetic rubbers affected by weathering. **03**
 - (b)** Explain the effect of weather on styrene-butadiene rubber (SBR). **04**
 - (c)** Discuss in detail the effect of weathering on mechanical properties of rubber (hardness, tensile strength, elongation). **07**
