

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**ME SEMESTER II EXAMINATION – SUMMER 2017**

**Subject Code: 2724008**

**Date:30/05/2017**

**Subject Name: Physics of Rubber Elasticity**

**Time:02:30 PM to 05:00 PM**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Discuss the general conditions for rubber-like elasticity. (07)

(b) Explain in detail about Crystallization in raw rubber. (07)

Q.2 (a) Establish the relation between force, length & temp. With thermodynamic quantities, internal energy & entropy. (07)

(b) Describe in detail about Statistical form of long-chain molecules. (07)

OR

(b) Discuss about Entropy of a single chain. (07)

Q.3 Explain the calculation of entropy of deformation. (14)

OR

Q.3 (a) Discuss about the principal stresses in the state of pure homogeneous strain. (07)

(b) Short note on “Elastic properties of a Swollen rubber.” (07)

Q.4 Explain the stress – strain relations in terms of simple extension, uniaxial compression, equi-biaxial extension, simple shear & pure shear. (14)

OR

Q.4 (a) Short note on “Diazocompounds as cross-linking agents.” (07)

(b) Discuss the effects of entanglements on network elasticity. (07)

Q.5 Write in detail about Statistical treatment of Swelling. (14)

OR

Q.5 (a) Short note on “Swelling of Cross-linked Polymers.” (07)

(b) Explain the relation between Swelling & Modulus. (07)

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