

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

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

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-IV(NEW) – EXAMINATION – SUMMER 2019****Subject Code:2142606****Date:15/05/2019****Subject Name: Viscoelasticity of Elastomers****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) Derive the equation for the entropy generated force in polymer chain. **03**  
(b) Give the difference between Viscosity and Apparent Viscosity. **04**  
(c) Explain in detail about the Bulk modulus with Suitable Example. **07**
- Q.2** (a) Write about the Deborah number. **03**  
(b) Give the difference between Dynamic viscosity and Kinematic viscosity **04**  
(c) Explain the Capillary viscometer in detail. **07**
- OR**
- (c) Explain the “Theory of Viscosity”. **07**
- Q.3** (a) List the molecular requirements of Elastomers. **03**  
(b) Give the comparison of Time dependent & Time independent non Newtonian fluid. **04**  
(c) Discuss in detail about the “Viscoplastic fluids.” **07**
- OR**
- Q.3** (a) What is the difference between Pseudoplastic and Dilatant fluid? **03**  
(b) List out the classification of fluids and explain any one in brief. **04**  
(c) Explain in detail about the Thixotropic and Rheopectic fluids in detail. **07**
- Q.4** (a) Give the advantages of Voight Model. **03**  
(b) Write a brief not on Superposition Principles. **04**  
(c) Discuss the Four parameter model in detail. **07**
- OR**
- Q.4** (a) Derive the creep experiment equation for Maxwell model. **03**  
(b) Give the difference between Stress Relaxation and Retardation. **04**  
(c) A bar of polypropylene is of length 200 mm and has a rectangular cross section of diameters 25 mm X 3 mm. It is subjected to a constant tensile load of 250 N acting along its length. 100 s after the load was applied the length is measured and is found to have increased by 0.5 mm. Determine the 100 s tensile creep compliance. **07**
- Q.5** (a) Write about the Creep Compliance and Relaxation Modulus. **03**  
(b) “Bulky Side group affects the Glass transition temperature” justify the statement. **04**  
(c) Describe the transitions and associated properties with respect to glass transition temperature. **07**
- P.T.O**
- OR**
- Q.5** (a) How the elastic fluids responses under creep test? **03**  
(b) Write the observation from the phase states of substance and their comparison with the states of aggregates. **04**  
(c) List out the different factors affecting glass transition temperature explain any two in detail. **07**

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