Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-Vth Examination December 2010

Subject code: 152604 **Subject Name: Rheology of Rubber**

Date: 18 /12 /2010 **Time: 03.00 pm - 05.30 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use Graph Papers wherever necessary.**
5. **Assume suitable data wherever necessary.**

Q.1 **(a)** Define the term Rheology and Explain any two Rheological Equation in brief. **04**

(b) A Plastic fluid gave the following Stress-Shear rate data, Explain the fluid behavior from Rheogram and calculate constants. **06**

$T_{x\,10^{-4}}$, N/m^2	(-du /dr), s^{-1}
10.0	0.1
19.6	1.0
31.0	2.0
49.0	4.0
92.0	8.0
164.0	15.0
210.0	20.0
700.0	70.0
1005.0	100.0
2100.0	200.0
4010.0	400.0

(c) Explain the classification of Fluids. **04**

Q.2 **(a)** Write a note on Flow between Parallel Plates. **06**

b) Write a note on Flow through Annulus. **08**

OR

(b) Explain in detail about Transition between Laminar and Turbulent flow. **08**

Q.3 **(a)** Describe in brief about Static Test. **06**

(b) Explain in detail about the Mechanical Models for Visco-Elastic Systems. **08**

OR

Q.3 **(a)** Discuss in brief about Dynamic Test. **06**

(b) Explain Boltzman Superposition principle with its application. **08**

Q.4 **(a)** Explain the effect of temperature on Visco-elastic material. **06**

(b) Explain in detail the effect of molecular parameters on the Polymer Rheology. **08**

OR

Q.4 **(a)** Explain the effect of Molecular weight and Structure on Rheology of Rubbers. **06**

(b) Explain the work done in Cyclic deformation in any Visco-Elastic Body. **08**

Q.5 **(a)** Discuss in detail about the Rheology of Extrusion process. **08**

(b) Write a Short note on Cone and Plate Viscometer. **06**

OR

Q.5 **(a)** Draw the Schematic diagram explaining different parts of Injection Mould and Explain material phenomena inside the cavity. **08**

(b) Write a Short note on Compression Plastimeters.. **06**

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