

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. Sem-III (Rubber Technology) Examination December 2009

Subject code: 132601

Date: 17 / 12/ 2009

Subject Name: Basic Rubber Science

Time: 11.00 am – 1.30 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 characteristic properties of rubber. **06**
(b) Answer the followings.
(i) Write in brief about 'segmental motion' in rubber. **02**
(ii) Explain the conditions, which are necessary for any material to behave as rubber. **06**
- Q.2** (a) Answer the following
(i) What do you mean by isoelectric point and electro-osmosis point? Discuss in detail with examples. **04**
(ii) Write the preparation of colloidal solution by reduction method and oxidation method. **03**
(b) State the experimental laws of friction. Give the modification to these laws for applications to rubber. **07**
- OR**
- (b) Write a short note on diffusion in elastomers. **07**
- Q.3** (a) Answer the following
(i) Give the importance of density determination in rubber. Describe the method for determining relative density of carbon black powder and also list the sources of error in it. **05**
(ii) Write a short note on 'bulk modulus', 'shape factor' and 'elastic collision'. **04**
(b) Explain the working of 'Lectone du Nouy tensiometer'. What will be the surface tension if mass of liquid raised is 5grams and the circumference of ring is 3cm. **05**
- OR**
- Q.3** (a) Answer the following
(i) Explain the phenomenon of total internal reflection, constructive and destructive interference and polarization. Find the velocity of light in glass if refractive index of glass is 1.5. **05**
(ii) Describe different modes of heat transfer. **04**
(b) Discuss on transmissibility of oscillations and vibration isolation. **05**
- Q.4** (a) Answer the following
(i) Give the difference between addition polymerization and condensation polymerization. **04**
(ii) Write a short note on 'initiator'. **04**

- (b) Explain the bulk polymerization technique with its advantages and disadvantages. **06**

OR

- Q.4 (a)** Answer the following
- (i) Which are the various modes of addition of incoming monomers to growing chain in propagation step? **04**
- (ii) Explain the terms 'organic polymer' and 'inorganic polymer' respectively with suitable examples and their structures. **04**
- (b) Write a short note on cationic polymerization. **06**

- Q.5 (a)** Answer the following
- (i) Give the difference between 'crystalloids' and 'colloids'. **02**
- (ii) Write the applications of emulsions. **02**
- (iii) Explain the Tyndall effect. **02**
- (b) Discuss the purification of colloidal solution. **08**

OR

- Q.5 (a)** Answer the following
- (i) Write about Schulze-Henry law. **02**
- (ii) What do you mean by 'Micelles'? Write its examples also. **02**
- (iii) Draw the figure for formation of gel showing colloidal dispersion and gel structure. **02**
- (b) Explain in detail about the difference between lyophilic sol and lyophobic sol. **08**
