

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2162604

Date:18/05/2019

Subject Name:Characterisation 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.

- Q.1** (a) List out the chemicals which are used in determination of free sulphur present in vulcanizate. **03**
 (b) Write about the different test specimen preparation methods. **04**
 (c) Discuss in detail about the classification of standards. **07**

- Q.2** (a) Which characteristic information related to rubber is obtained by Wide Angle X-ray Scattering? **03**
 (b) Write about main difficulties in exploitation of Transmission Electron Microscopy. **04**
 (c) Explain the given features with respect to Electron Microscopy:(i) Secondary Electrons(ii) Back Scattered Electrons **07**

OR

- Q.2** (c) Discuss in detail about the relaxation behavior of excited atoms with respect to Scanning Electron Microscopy (SEM). **07**

- Q.3** (a) Define the given terms:(i)Endothermic Peak (ii)Exothermic Peak (iii)Peak Width **03**
 (b) Write down the characteristics of good thermobalance design. **04**
 (c) Discuss in detail about the different transitions which are observed in standard Dynamic Mechanical Analysis(DMA) curve of rubber. **07**

OR

- Q.3** (a) Define the given terms: (i)Peak Height (ii)Peak Area (iii)extrapolated Onset **03**
 (b) Which different types of probe geometries are used in Thermomechanical Analysis (TMA) of rubber? **04**
 (c) Differential Thermal Analysis is the best tool to propose a mechanism of crosslinking- Justify this statement with suitable example of rubber. **07**

- Q.4** (a) Write about types of columns used in Gas Chromatography. **03**
 (b) List the types of detectors used in High Performance Liquid Chromatography. Write on any one. **04**
 (c) Discuss in detail about the principle and separation mechanism of Gel Permeation Chromatography(GPC) **07**

OR

- Q.4** (a) Which sample injection systems are used in Gas Chromatography? **03**
 (b) Write in brief on instrumentation of High Performance Liquid Chromatography (HPLC). **04**
 (c) Discuss in detail about the preparatory and operational steps of Thin Layer Chromatography (TLC). **07**

- Q.5** (a) Write a note on 'fingerprint region'. **03**
 (b) Write a short note on single beam UV-Spectrophotometer. **04**
 (c) Discuss in detail about Beer-Lambert's law. **07**



Q.5

- (a) Which information related to rubber is obtained by Infrared Spectroscopy? **03**
- (b) Write a short note on double beam UV-Spectrophotometer. **04**
- (c) Discuss applications of Fourier Transform Infrared Spectroscopy with suitable case study of rubber and related material. **07**

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