

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2019****Subject Code: 2152601****Date: 06/06/2019****Subject Name: Vulcanisation****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) Differentiate vulcanized rubber and unvulcanized rubber. **03**
 (b) List out the different allotropic forms of sulphur. Write on any two. **04**
 (c) Discuss in detail about the vulcanization of thick rubber articles. **07**

- Q.2** (a) Write a brief note on 'Dynamic Vulcanization'. **03**
 (b) With labeled diagram, explain the construction of Moving Die Rheometer(MDR). **04**
 (c) Explain the reaction chemistry of sulphur vulcanization. **07**

OR

- Q.2** (c) Define the term 'crosslinks density'. Explain effect of crosslink density on the given properties of vulcanizate with graph:(i) Modulus and Strength (ii)Hysteresis (iii) Resilience **07**

- Q.3** (a) Write in brief on xanthate accelerator. **03**
 (b) Explain the term 'crosslinking efficiency' with respect to peroxide cure. How it can be improved? **04**
 (c) Write a short note on thiourea accelerators. **07**

OR

- Q.3** (a) Give any two examples of peroxides with carbonyl group with it's structure. **03**
 (b) Explain the vulcanization by metal oxides with suitable example. **04**
 (c) Write a short note on sulphur donors. **07**

- Q.4** (a) Explain the physical method to assess the state of cure. **03**
 (b) Give comparison between various continuous vulcanization techniques. **04**
 (c) Discuss in detail about the limitations of vulcanization temperatures. **07**

OR

- Q.4** (a) Which different phases are observed during free heating? **03**
 (b) How vulcanization is carried out in autoclave? **04**
 (c) Discuss the following features with respect to liquid curing method:(i)Influence of accelerator and vulcanizing agents(ii)Advantages and Disadvantages **07**

- Q.5** (a) Explain the working principle of fluidized bed vulcanization technique. **03**
 (b) How vulcanization is carried out under water? **04**
 (c) Discuss in detail about electron beam vulcanization technique. **07**

OR

- Q.5** (a) Give the limitations of hot air vulcanization technique. **03**
 (b) Write a short note on cold cure. **04**
 (c) Discuss in detail about the microwave vulcanization technique. **07**
