**Seat No.: _____** **Enrolment No._____**

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–IV (NEW) - EXAMINATION – SUMMER 2017**

**Subject Code: 2142602** **Date: 08/06/2017**

**Subject Name: Natural Rubber Science & Technology**

**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.**

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|---|---|---|---|
| **Q.1** | | **Answer the following:** | **(14)** |
| | **1** | **Give the percentage of field coagulum presented in SMR GP.** | |
| | **2** | **Draw the chemical structure of NR showing allylic and vinylic hydrogen.** | |
| | **3** | **What is the effect of degree of Epoxidation on molecular weight?** | |
| | **4** | **Give the role of azodicarboxylate in polystyrene grafting mechanism.** | |
| | **5** | **What are the density values for NR crystal unit cell and amorphous unfilled rubber?** | |
| | **6** | **List the types of Reclaimed Rubber.** | |
| | **7** | **Which non-rubber substance is responsible for pale yellow color of crepe rubber?** | |
| | **8** | **What do you mean by crumb rubber?** | |
| | **9** | **Give two names of partitioning agents used in powdered rubber preparation.** | |
| | **10** | **Define the term: Diffusion.** | |
| | **11** | **Which equipment can be used for mixing of powdered rubber?** | |
| | **12** | **Draw the network structure of liquid rubber.** | |
| | **13** | **List the categories of black filler.** | |
| | **14** | **Give the equation showing relation between Young's modulus and shear modulus.** | |
| **Q.2** | **(a)** | **Write about Brown and Blanket Crepes.** | **(03)** |
| | **(b)** | **Discuss about Storage Hardening in Natural Rubber.** | **(04)** |
| | **(c)** | **Write a short note on Epoxidation Chemistry.** | **(07)** |
| | | **OR** | |
| | **(c)** | **Explain in detail about the types of depolymerized rubber according to degree of degradation.** | **(07)** |
| **Q.3** | **(a)** | **List the stages of preparation of NR graft copolymers.** | **(03)** |
| | **(b)** | **Describe the grafting reaction on cis-1,4-polyisoprene.** | **(04)** |
| | **(c)** | **Discuss the general features of wax blooming.** | **(07)** |
| | | **OR** | |
| **Q.3** | **(a)** | **What is the effect on tensile strength with variation in polystyrene content for NR and IR graft copolymer?** | **(03)** |
| | **(b)** | **Write in brief about Hevea Plus MG.** | **(04)** |
| | **(c)** | **List the parameters which affect the rate of diffusion? Explain any two in detail.** | **(07)** |
| **Q.4** | **(a)** | **Write about the applications of reclaimed rubber.** | **(03)** |

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| | **(b)** | **Discuss about Digester Process.** | **(04)** |
| | **(c)** | **List the stages of low temperature crystallization and explain about them in detail.** | **(07)** |

**OR**

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| **Q.4** | **(a)** | **How the Reclaimed rubber is produced by Pan Process?** | **(03)** |
| | **(b)** | **Write about properties of reclaimed rubber as a compounding ingredient.** | **(04)** |
| | **(c)** | **Discuss the low temperature crystallization observed in Natural Rubber by the experimental set up of tensile test and compression test specimens respectively.** | **(07)** |
| **Q.5** | **(a)** | **Write in brief about classes of commercially established Liquid Elastomers.** | **(03)** |
| | **(b)** | **How the Puncture test is carried out? Explain with suitable diagram.** | **(04)** |
| | **(c)** | **List the methods for preparation of powdered rubber. Describe any two in detail.** | **(07)** |

**OR**

| | | | |
|---|---|---|---|
| **Q.5** | **(a)** | **Write in brief about the Liquid Polysulphide Polymers.** | **(03)** |
| | **(b)** | **Discuss about 'Flexible rubber-steel laminates' with suitable diagram.** | **(04)** |
| | **(c)** | **List the advantages of Powdered & Particulate rubbers.** | **(07)** |

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