

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2018****Subject Code: 2172609****Date: 03/12/2018****Subject Name: Rubber Recycling & Waste Management****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) Write in brief about cryogenic process for the production of crumb rubber. (03)
(b) List the advantages water jet process for the production of crumb rubber. (04)
(c) Discuss in detail about sintering techniques to produce products from crumb rubber. (07)

- Q.2** (a) Which properties of cured rubber will be improved by incorporating ground vulcanizate? (03)
(b) Which are the ways to estimate the degree of diffusion of softener, anti-oxidants, accelerators and stearic acid into ground vulcanisates? (04)
(c) Discuss in detail about the influence on cured rubber due to the loading and particle size of the ground vulcanizate. (07)

OR

- (c) Explain in detail about the effect of the degree of cross-linking in polymer phase on properties of cured rubber. (07)
- Q.3** (a) How the covalent bond energies play a role in devulcanisation of rubber? (03)
(b) List the disadvantages of using chemical agents for Mechanical devulcanisation process. (04)
(c) Explain in detail about Thermal Devulcanisation process. (07)

OR

- Q.3** (a) Give the benefits of mechanical devulcanisation process. (03)
(b) Describe the background of the process of Microbiological devulcanisation. (04)
(c) Write a short note on grinding of textile cord tyres. (07)
- Q.4** (a) What do you mean by pyrolysis? (03)
(b) Write about Oxidative process for pyrolysis. (04)
(c) Draw the schematic diagram for tyre pyrolysis proposal. Explain it in detail with its importance. (07)

OR

- Q.4** (a) How Boudouard carbon can be produced? Write its applications. (03)
(b) Write about the Reductive process for pyrolysis. (04)
(c) Draw the schematic diagram for Rotary kiln pyrolysis reactor. Explain its working mechanism with advantages and disadvantages. (07)
- Q.5** (a) How crumb rubber can be used in sports ground applications? (03)
(b) Write about the use of rubber crumb for preparation of binder in road pavement construction. (04)
(c) Discuss in detail about production of cationites and anionites from scrap tyre. Write its applications. (07)

OR

- Q.5**
- (a) How crumb rubber can be used as heat and sound insulating material? **(03)**
 - (b) Write about the use of rubber crumb with asphalt-concrete mixes. **(04)**
 - (c) Describe the utilization and importance of scrap tyre for following: **(07)**
 - (i) Soil modification
 - (ii) Production of oligomers

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