

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: DTP 1024
COURSE	: RUBBER TECHNOLOGY
SEMESTER/SESSION	: 1-2024/2025
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **3** questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 3 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1 (34 MARKS)

Fillers are used as additives in rubber to improve the mechanical properties

- a) Show three (3) differences between reinforcing and non-reinforcing fillers. (8 marks)
- b) Kaolin clay is also called kaolinite or China clay. Discover five (5) basic processes in producing clay from the mined form. (10 marks)
- c) Mixing and processing of carbon black in rubber are crucial for performance properties. Construct three (3) mixing stages of carbon black dispersion. (9 marks)
- d) Calcium carbonate (CaCO_3) is one of the non-black fillers. (3 marks)
 - i. Show three (3) benefits of using the CaCO_3 . (4 marks)
 - ii. Present two (2) applications of CaCO_3 in industry and the reasons for the selection.

QUESTION 2 (32 MARKS)

There are several ways of waste disposal and recycling of rubber.

- a) Discover the waste disposal methods briefly.
 - i. Pyrolysis. (4 marks)
 - ii. Pulverisation. (4 marks)
 - iii. Microwave. (4 marks)
- b) Identify two (2) usages of recycled rubber. Present a few points to support the answer. (8 marks)
- c) Based on your opinion, show & debate three (3) methods to reduce the plastic waste problem. (6 marks)
- d) The reclaiming process is one of the recycling methods. Discover how the method is done. (6 marks)

QUESTION 3 (34 MARKS)

Rubber testing covers several analyses to ensure the samples are well performed.

- a) A tensile machine known as a 'universal' machine is used to determine several analyses.
 - i. Show the purpose of the tensile test. (2 marks)
 - ii. Sketch the tensile stress-strain curve. Label all of the points in the graph. (8 marks)
- b) Hardness testing aims to measure the modulus of rubber by appliance of force. The two (2) methods used are dead load and durometers. Discover the differences between the methods. (6 marks)
- c) Tear test is run by arranging the geometry of the test piece. Illustrate the four (4) methods and name all of them. (8 marks)
- d) The swelling test is affected by a medium of liquid.
 - i. Present the method used in the analysis. (6 marks)
 - ii. Illustrate the example of the result graph after the analysis is done. (4 marks)

-----End of question-----

