

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

COURSE CODE	: BPE 2214
COURSE	: RUBBER TECHNOLOGY
SEMESTER/SESSION	: 2-2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **4** 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

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

- a) Define the reinforcing fillers and give three (3) criteria affecting the filler activity. (4 marks)
- b) Kaolin clay 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. Determine three (3) mixing stages of carbon black dispersion. (6 marks)

QUESTION 2

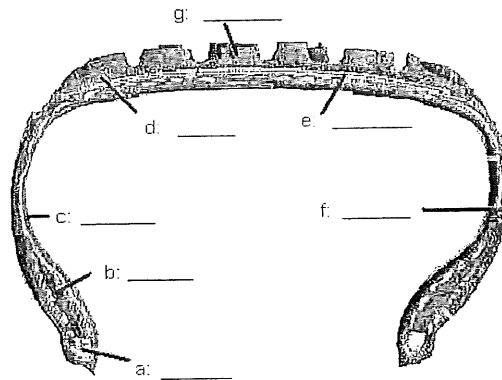
Rubber testing covers several analyses to ensure the samples are well performed.

- a) Tensile machine or can be known as 'universal' machine is used to determine several testing.
 - i. Find the purpose of tensile test. (2 marks)
 - ii. Illustrate the tensile stress-strain curve. Label all the points in the graph. (8 marks)
- b) The purpose of hardness testing is to measure the modulus of a rubber by appliance of force. The two (2) methods used are dead load and durometers. Differentiate 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) Swelling test is affected by liquid media. Debate the method used in analysis and illustrate the example of graph result after the analysis is done. (10 marks)
- e) Compression set testing is done to approximate the perfect slippage. Construct the graph of compression testing. (6 marks)

QUESTION 3

Pneumatic tires are manufactured according to relatively standardized processes and machinery.

- a) Label the tire parts below from (a) to (g). (7 marks)



- b) List all five (5) departments of tire manufacturing process. (5 marks)
- c) Apex is one of the tire parts from question (a). Discover the purpose of Apex. (4 marks)
- d) Discuss the function of accelerators and activators. (4 marks)

QUESTION 4

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

- a) Describe the waste disposal methods briefly. (12 marks)
- i. Pyrolysis
 - ii. Pulverisation
 - iii. Microwave
- b) Identify two (2) usages of recycled rubber. Debate few points to support the answer. (8 marks)

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

