

Uva Wellassa University
Faculty of Animal Science & Export Agriculture
BSc in Palm & Latex Technology & Value Addition



End Semester Examination – March/April 2013
Year II Semester II /Year III Semester I

Palm and Latex Industrial Machinery (PLT 234-2)

Instructions

Answer all questions

No. of questions : Four (04)

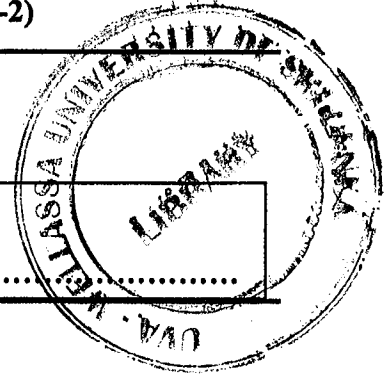
No. of pages : Two (02)

Time : Two (02) hours

Total marks allocated : 40%

Index No:

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Question 01

- I. Explain the flow (rheological) behaviour of following materials when a stress is applied, hold and subsequently removed.
 - a) Compounded natural rubber (before vulcanization)
 - b) Compounded vulcanizate of natural rubber (after vulcanization)
- II. Compare and contrast the flow behaviour of above two materials

(Note: Answer should include graphical presentation of stress and strain with respect to time)

(25 marks)

Question 02

- I. Two natural rubber (NR) compounds were prepared using a laboratory scale two roll mill according to the formulation given below. Tensile properties of both vulcanizates (NR-A and NR-B) were analyzed using a tensile machine.

Compounding ingredients	NR-A(phr)	NR-B(phr)
Natural rubber	100	100
CaCO ₃	40	-
Hard clay	-	40
Zinc Oxide	05	05
Stearic acid	02	02
Sulphur	2.5	2.5
Vul. accelerator	1	1

- a) Draw the possible stress-strain curves for both vulcanizates and show how you could obtain tensile properties from the curves
 - b) Compare the two stress-strain curves and suggest the possible reasons for this behaviour
- II. NR-A compound was additionally mixed with 40 phr of carbon black (CB) and analyze for hysteresis using the same tensile machine
- a) Draw the hysteresis curves (hysteresis loop) for both compounds (i.e. NR-A and NR-A with CB)
 - b) Compare and contrast the hysteresis curves of both compounds

(25 marks)

Question 03

Discuss how you could effectively use operating parameters of a laboratory scale internal mixture to prepare a rubber compound with a uniform dispersion and distribution of carbon black

(25 marks)

Question 04

Briefly discuss the following;

- I. Thermo-oxidative stability of a rubber compound can be evaluated using an Oscillating Disc Rheometer (ODR)
- II. Nitrile rubber (NBR) is preferred over natural rubber (NR) for making oil seals
- III. Mooney Viscometer can be used to measure the elastic behaviour of a rubber compound

(25 marks)