

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



End Semester Examination – September/October 2012
Year III Semester II

Uva Wellassa
University

Palm and Latex Industrial Machinery (PLT 331-2)

Instructions

Answer all questions

No. of questions : Four (04)

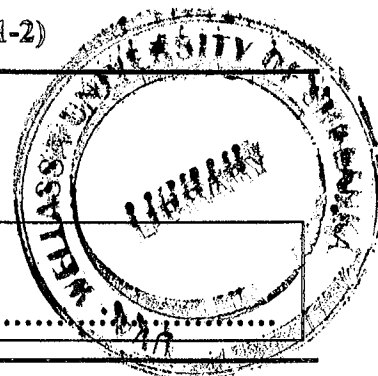
No. of pages : Two (02)

Time : Two hours

Total marks allocated : 100%

Index No:

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Question 01

Two highly filled natural rubber compounds (i.e. NR-A and NR-B) were prepared using a laboratory scale internal mixer at 60 °C with a rotor speed of 60 rpm. Formulation for each compound is as follows

Compounding ingredients	NR-A (phr)	NR-B (phr)
Natural rubber	100	100
Carbon black	40	40
Processing oil	10	00
Zinc Oxide	05	05
Stearic acid	02	02
Sulphur	5	5
Vul. accelerator	2	2

- I. Briefly explain how you could measure the Mooney Viscosity of the natural rubber used in the above compounds.
- II. Draw rheographs (cure curves) for both NR-A and NR-B compounds
- III. Compare the two rheographs and suggest the possible reasons for this behaviour
- IV. If you add a pre-vulcanization inhibitor (PVI) to the NR-B compound, predict the rheograph for the modified NR-B compound.

(35 marks)

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Question 02

Briefly discuss the following;

- I. Rheological (flow) behavior of ideal solids
- II. Natural rubber is a viscoelastic material

(Note: examples (i.e. viscoelastic response) should be included in the answer)

(15 marks)

Question 03

Stress-strain properties of an un-filled natural rubber (NR) vulcanizates (NR-gum vulcanizate) were measured using a Universal Tensometer. The NR gum compound is mixed with a 30 phr of carbon black (CB) and measured the stress-strain properties using the same machine.

- I. Sketch a typical stress-strain curve for the un-filled NR vulcanizates
- II. Draw a stress- strain curve for the carbon black filled NR vulcanizates and compare with the NR-gum vulcanizates.
- III. Briefly explain the rebound resilience and heat build-up properties of the CB filled NR compound in comparison to un-filled NR compound

(25 marks)

Question 04

Write short notes on the following;

- I. Two roll mill for rubber compounding
- II. Dispersive and distributive mixing
- III. Compression moulding of rubber compounds

(25 marks)