UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF ANIMAL SCIENCE & EXPORT AGRICULTURE

BSc in Palm and Latex Technology and Value Addition
Second Year Second Semester Examination – December/January -2016/2017

Palm and Latex Industrial Machinery (PLT 234 - 2)
Section II – Essay Questions

Instructions:
Answer all questions in Part A and Part B in separate booklets.
No. of questions : Two (02)
No. of pages : Two (02)
Time : One (1) hour
Total marks allocated : 50 %

Part A

01. Three natural rubber (NR) compounds were prepared using a laboratory scale internal mixer according to the formulation in the table given below.

Compounding ingredients	NR-gum compound (phr)	NR-B (phr)	NR-C (phr)
Natural rubber	100	100	100
Carbon black	-	50	-
$CaCO_3$	-		50
Processing oil	-	05	05
Zinc oxide	05	05	05
Stearic acid	03	03	03
Sulphur	2.5	2.5	2.5
Accelerator	1.2	1.2	1.2

(I) Briefly explain how you could effectively use the laboratory scale internal mixer to achieve uniform dispersion and distribution of carbon black in the NR-B compound.

(25 marks)

(II) Draw the tensile stress-strain curve for NR-gum vulcanizate and mark all tensile properties on the graph.

(25 marks)

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(III) Draw possible tensile stress-strain curve of NR-B and compare with NR-gum vulcanizate (Note: Draw all stress-strain curves in a single graph).

(25 marks)

(IV) Briefly discuss the heat build-up behaviour of NR-B and NR-C vulcanizates.

(25 marks)

Part B

02. Critically explain the following statements (Support your answer with graphs where ever necessary).

(I) When a stress is given for a certain time and then released for a viscous material, the strain is not recovered.

(II) The rubber cannot function as an elastomer in high temperature regions.

(III) Creep and Stress relaxation varies for viscous materials and visco-elastic materials.

(IV) The elastic property of a rubber varies with degree of crystalline and amorphous region.

(25 × 4 = 100 marks)

[End of section II]