UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 7 Examination in Engineering: August 2015

Module Number: ME 7330 **Module Name: Polymer Technology**

[Three Hours]

[Answer **all questions**, each question carries twelve marks]

Q1 a) Sketch the diagram of plastic injection molding machine and briefly explain the machine and its basic components.

[2.5 Marks]

b) Describe the plastic injection molding process.

[2.5 Marks]

c) Discuss the advantages and disadvantages of injection molding process compared to other plastic processing methods.

[2.5 Marks]

d) What are the potential environmental impacts of polymer industries?

[2.5 Marks]

e) How do you protect our environment from above impacts?

[2.0 Marks]

Q2. a) Explain the various phase transitions of an amorphous and a semi-crystalline polymer.

[3.0 Marks]

b) What is meant by glass transition temperature of polymers?

[3.0 Marks]

c) Discuss the factors affecting the crystallinity of polymers.

[3.0 Marks]

d) How does crystallinity affect the properties of polymers?

[3.0 Marks]

Q3. a) Compare the addition polymerization and the condensation polymerization with suitable examples.

[3.0 Marks]

b) What is Teflon? Why it exhibit a high thermal stability?

[3.0 Marks]

c) Explain a technique by which continuous polymer films are obtained.

[3.0 Marks]

d) What are the difficulties in the technique you answered in above (c) and parameters to be controlled for the in the above process?

[3.0 Marks]

Q4. a) Explain the factors to be considered in formulating a rubber compound.

[1.5 Marks]

b) How does the ozone affect the molecular structure and the properties of natural rubber?

[1.5 Marks]

c) Draw a neat sketch of a two roll mill and explain the various parts and functions of them.

[2.5 Marks]

d) Explain the process of two roll mill mixing?

[2.0 Marks]

e) Briefly explain the calendaring process and different arrangements of calendaring rollers (with the aid of clear sketches) with respect to the final product.

[2.0 Marks]

f) Explain at least two faults or processing difficulties in calendaring and suggest remedial actions for them.

[2.5 Marks]

Q5. a) How the ***nylon 6*** is prepared industrially? What are the important properties of it?

[2.5 Marks]

b) Explain the reaction between phenol and formaldehyde. Briefly explain the applications, and advantages of PF resin?

[2.5 Marks]

c) With the aid of a clear sketch, explain the activities involved in a compression molding cycle time.

[3.5 Marks]

d) With aid of cleat sketches, explain the manufacturing process of insulation layer on electrical wires.

[3.5 Marks]