



EASTERN UNIVERSITY, SRI LANKA

FIRST YEAR EXAMINATION IN SCIENCE

SECOND SEMESTER 2010-2011 (June/July 2013)

CH 105 INTRODUCTION TO POLYMER CHEMISTRY

(Proper and Repeat)

Answer all questions

Time: 01 hour

1) i) Define the following terms

- a) Monomers b) Semi-crystalline polymer

[10 marks]

ii) Differentiate between the following and give two examples for each

- a) natural polymers and synthetic polymers
b) thermoplastics and elastomers

[20 marks]

iii) Briefly discuss each of the following chain polymerization steps, using the free radical polymerization of styrene to illustrate each step

- a) Initiation
b) Propagation
c) Termination by transfer to polymer
d) Termination by disproportionation
e) Termination by chain transfer

[20 marks]

Turn over

iv) Explain the mechanism with the aid of curly arrows for each of the following steps in the polymerization of 2-methylpropene (isobutene) with BF_3 and water

- a) Initiator (H^+) generation from BF_3 and water
- b) monomer initiation
- c) chain propagation (show a unit consisting of two isobutene units)
- d) termination by elimination of H^+

[20 marks]

v) Explain the following terms with suitable diagrammatic representation

- a) molar mass distribution curve of a polymer
- b) block co-polymers
- c) graft co-polymers.

[30 marks]

2) i) What is glass transition temperature? List the importance of glass transition temperature.

[10 marks]

ii) What do you mean by degree of polymerization? what would be the degree of polymerization of polyethylene of molecular mass of 35000 gmol^{-1} ?

[20 marks]

Turn over



iii) "Emulsion polymerisation provides the basis for the controlled synthesis of selected monomer systems in environmental friendly conditions". Briefly explain how this technique operates and list out the advantages and disadvantages of the technique.

[20 marks]

iv) list the similarities and the differences between suspension polymerisation and emulsion polymerisation.

[20 marks]

v) Explain the following terms to describe a polymer with suitable diagrammatic representation

a) Atactic

b) Isotactic

c) Syndiotactic

[30 marks]

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