Uva Wellassa University

Faculty of Animal Science & Export Agriculture

BSc in Palm and Latex Technology & Value Addition

End Semester Examination September/October 2012

Year III Semester II

Uva Wellassa University

Polymer Chemistry (PLT 344-2)

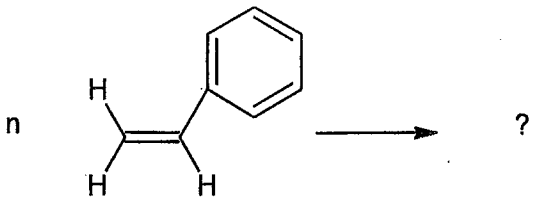
Instructions

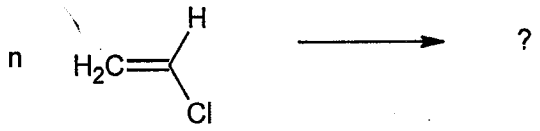
Answer **only four (04)** questions **including Question 01.**

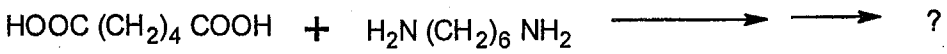
No. of questions	:	Five (05)
No. of pages	:	Three (03)
Duration	:	Two hours
Total marks allocated	:	100 %

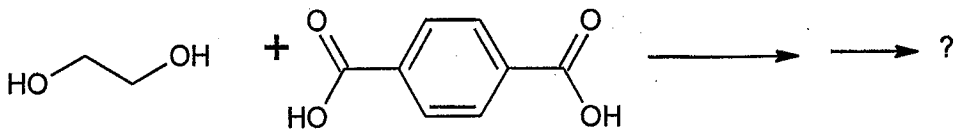
1.

a) Draw the structures of the polymers produced in the following reactions.

i. 

ii. 

iii. 

iv. 

(20 Marks)

b) Give **two (02)** examples for each of the followings.

i. Natural polymers

ii. Synthetic polymers

iii. Semisynthetic polymer

iv. Condensation polymer

v. Addition polymer

vi. Thermosets

(12 Marks)

c) Explain the following terms briefly with the aid of suitable diagrams.

i. Homo polymers and copolymers

ii. Isotasctic. atactic and syndiotactic polymers

iii. Linear and branched polymers

(28 Marks)

d) Calculate the number-average molecular weight (M_n), the weight-average molecular weight (M_w) and the polydispersity index (PDI) for a given sample having a 1:2:1 ratio of the number of moles of polymer chains of exact molecular weights 482, 2768 and 5308 g/mol, respectively.

(30 Marks)

e) How do you determine the glass transition temperature of a given polymer?

Sketch the graphs of specific volume versus temperature for following types of polymers.

i. 100 % crystalline polymer

ii. 100 % amorphous polymer

iii. Partially crystalline polymer

(30 Marks)

2. Compare and contrast following.

    a) Bulk polymerization and suspension polymerization

    b) Chain growth polymerization and step growth polymerization

(60 Marks)

3.

    a) Name **three (03)** different kinds of initiators used in addition polymerization. Give **one (01)** example for each.

    b) Explain the mechanism of action for each initiator **at the initiation step** of different polymerization processes.

(60 Marks)

4. Write brief notes on following.

    a) Vulcanization of rubber

    b) Intermolecular forces in polymer

    c) Polymer crystallinity

(60 Marks)

5. Polymeric substances usually contain a range of molecular weights and all the practical methods used determining the molecular weights of polymers do not use the same averaging procedure.

    a) Briefly explain **two (02)** averaging procedures use to express the molecular weights of polymer.

    b) Describe **one (01)** laboratory technique that can be used in determination of molecular weights of polymer.

(60 Marks)