

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEMESTER – • EXAMINATION – SUMMER 2015

Subject Code:133602

Date: 27/05/2015

Subject Name: Polymer Chemistry for Chemical Technology

Time: 02.30pm-05.00pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain LCST and UCST with proper phase diagrams. **07**  
(b) Describe in detail the characteristics of addition and condensation polymerization. **04**
- Q.2** (a) Explain solution polymerisation and bulk polymerisation with examples of polymers produced using these methods of polymerisation. **02**  
(b) Write in detail the reactions involved in anionic polymerization and determine the rate of propagation and degree of polymerisation for the same **07**
- OR**
- (b) i) Why should distillation of crude oil done in two stages. **07**  
ii) Draw a neat flowchart of distillation of crude oil. Explain in detail the fraction of crude oil that is used as starting material for polymer and rubber industry
- Q.3** (a) Write a note on characteristics on copolymerization. **07**  
(b) i) What are the different ways of expressing molecular weight of a polymer? Give the formulas for expressing them. **07**  
ii) Write a short note on poly dispersity and molecular weight distribution in polymers.
- OR**
- Q.3** (a) i) Define glass transition temperature. **07**  
ii) What is the difference between melting point and glass transition temperature?  
iii) Write a note on glass transition temperature and factors affecting it.  
(b) What are the different components present in crude oil? Explain in detail **07**
- Q.4** (a) Explain in detail the Gel Permeation Chromatography(GPC) method for determining the molecular weight of polymer **07**
- (b) a) Define the following: i) Monomer ii) Polymer iii) Repeating unit iv) Degree of polymerisation v) Isotactic polymer vi) homo polymer vii) copolymer. **07**
- OR**
- Q.4** (a) How are the following synthesized: i) Phenol ii) Terephthalic acid iii) Melamine. **07**  
(b) How are the following synthesized? i) Caprolactum ii) Vinyl Chloride iii)Methacrylate. **07**
- Q.5** (a) i) For a compound to undergo polymerisation reaction it must be bi functional or at least have a double bond. Justify this statement. **07**

- ii) What are the end uses of polymers? Explain.
- (b) Compare emulsion and suspension polymerisation. **07**

**OR**

- Q.5** (a) Write in detail the reactions involved in free radical polymerization and determine the rate of propagation and degree of polymerisation for the same. **07**
- (b) Derive an expression for the rates of all the reactions involved in cationic polymerisation. Also derive expressions for degree of polymerisation in cationic polymerisation **07**