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SARDAR PATEL UNIVERSITY
M.Sc. – Chemistry (First Semester) (NC)
Polymer Chemistry-I [PS01ECHE22]
Wednesday, 27th March, 2019
Time: 10:00 a.m. - 01:00 p.m.

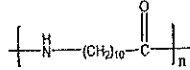
Total Marks: 70
[08]

- Q: 1 Select correct answer of the following questions.
- 1 The process of Vulcanization of rubber was introduced by
(A) Zeigler (B) Wholer (C) Charles Goodyear (D) Schonbein
 - 2 The repeating structural unit in Neoprene.....
(A) Chloroprene (B) Chloropicrin
(C) Chloroethane (D) Chlorofluoroethylene
 - 3 Which mode in the chain termination step is accompanied by a transfer of hydrogen molecule?
(A) Combination (B) Disproportionation
(C) Propagation (D) All of the mentioned
 - 4 Which of the following monomers are unsuitable for condensation polymerization?
(A) Hydroxyl acid
(B) Butane-dioic acid and ethylene Glycol
(C) Diamines and dicarboxylic acid
(D) Propanoic acid and ethanol
 - 5 What is the disadvantage of bulk polymerization?
(A) High temperature (B) Heat control
(C) Need catalyst (D) None of these
 - 6 The determination of weight average molecular weight from light scattering involves a double extrapolation on the same graph. This grid like figure is called.....
(A) Zimm plot (B) Turbidity plot
(C) Chromatogram (D) Mol. Wt. distribution curve
 - 7 What kind of substituent groups should be attached to the monomer, readily undergoing cationic polymerization?
(A) Electron accepting
(B) Electron releasing
(C) Both A and B
(D) None of the mentioned
 - 8 How is the solvent in solution polymerization, more useful to overcome the disadvantages of bulk polymerization?
(A) Causes chain transfer
(B) Increases the rate of reaction
(C) It reduces the viscosity gain
(D) All of the mentioned

(P.T.O.) 1

Q: 2 Attempt any SEVEN of the following [14]

1 If the number degree of polymerization $(\overline{Dp})_n$ for Nylon,



is 100 and $\overline{Mw} = 12000$. Calculate the number average molecular weight.

2 What is reactivity ratio? Write the methods for determination of reactivity ratio.

3 Explain ring opening polymerization of oxirane ring.

4 Write a note on Inhibitors using in chain growth polymerization.

5 Ionomers are superior to LDPE. Why?

6 Classify the polymers based on stereo regularity.

7 Comment on: Why is a minimum bifunctionality in the monomers necessary?

8 What is living polymerization? Why does it occur?

9 Explain: In suspension polymerization each droplets behaves as bulk polymerization system.

Q: 3 A Discuss in detail about membrane osmometry technique for molecular weight determination of polymers. [06]

B Derive the equation $\overline{Mv} = \left\{ \frac{\sum NiMi^{1+\alpha}}{\sum NiMi} \right\}^{1/\alpha}$ by using ubbelohde viscosity method. [06]

OR

B Answer the following.

(i) In a measurement for end group analysis 0.8632 gm of a carboxyl terminated polybutadienes sample dissolve in 1:3 mixture of ethanol and toluene consumed in 5:2 ml of 0.124 N alcoholic KOH solution in titration using phenolphthalein as the indicator. [03]

(ii) Write a short note on Glass transition temperature. [03]

Q: 4 A Why Co-ordination polymerization is known as insertion polymerization? Write mechanism of Ziegler- natta polymerization. [06]

B Describe kinetics of chain polymerization by free radicals. Obtain expression for rate of polymerization and degree of polymerization. [06]

OR

B (i) Define the term Ceiling temperature. [03]

(ii) Write salient feature of cationic polymerization. [03]

- Q: 5** **A** What are copolymers? Discuss the reactivity ratio and its copolymerization behaviour for free radical copolymerization? **[06]**
- B** (i) Explain polyaddition with suitable example. **[03]**
 (ii) Describe copolymer composition at higher conversions. **[03]**
- OR**
- B** Write kinetics of free radical copolymerization in brief. **[06]**
- Q: 6** **A** Give detail note on mechanism and kinetics of emulsion polymerization. **[06]**
- B** Write a short note on polymer additives. **[06]**
- OR**
- B** Give complete account on "Thermodynamics basis of polymer solubility". **[06]**

— X —
(3)

