

Sardar Patel University
M.Sc (Sem – I) Examination
Polymer Chemistry
Course No : PS01ECHE01
Friday, 7th December, 2012

Time : 10:30 am to 1:30 pm

Total Marks 70

Q.1 Choose the correct answer from the options. (8)

- i. The monomer in a polymer are joined through

(a) Covalent bonds	(b) H – bonds
(c) Ionic bonds	(d) co-ordination bonds
- ii. The rubber available in nature is

(a) trans-1, 4-polyisoprene	(b) 1,2- Polyisoprene
(c) 1,3- polyisoprene	(d) cis -1,4 – polyisoprene
- iii. The number average molecular weight is determined by

(a) Light scattering	(b) Ultra-centrifugation
(c) Osmometry	(d) Viscosity
- iv. Nylone – 6 is prepared by

(a) Addition Polymerization	(b) Condensation polymerization
(c) H-transfer polymerization	(d) Ring opening polymerization
- v. GPC technique determines which molecular weight?

(a) Number average	(b) weight average
(c) Z- average	(d) above all
- vi. Dioctylphthalate is

(a) Antioxidant	(b) Plasticizer
(c) Curing agent	(d) UV-Stablizer
- vii. Vapour pressure osmometry determines molecular weight accurately

(a) above 20,000	(b) below 20,000
(c) both	(d) none
- viii. Cross linking agent for PF-resole is

(a) Formaldehyde	(b) Phenol
(c) Hexamethylene tetramine	(d) none

Q.2 Answer the following (any seven) (14)

- i. Define monomer and polymer with suitable examples.
- ii. Explain chain growth and step growth polymerization.
- iii. Nylon 6,6 though crystalline dissolves in phenol.
- iv. Write in brief on solubility of polymer.
- v. Why polyethylene does not dissolve in any solvent at room temperature?
- vi. GPC determines relative molecular weight.
- vii. Explain ring-opening polymerization with suitable example.
- viii. Absolute molecular weight cannot be determined by viscometry.
- ix. What are organometallic polymers?

P.T.O

Q-3 (a) Classify polymers giving suitable examples (6)

(b) Describe viscosity technique for molecular weight determination of polymer (6)

OR

(b) Answer the following

(i) The two ends of an unsaturated polyester resin have an acid and hydroxyl groups respectively, Determine its molecular weight, if the acid value is 14. (3)

(ii) The average molecular weight of a polymer is 5,60,000 gm/mole and its has 20,000 degree of polymerization calculates the molecular weight of repeating unit. (3)

Q-4 (a) Answer the following

(i) Write the Z-N catalyst mechanisms that gives tactic polymer. (3)

(ii) Write methods of initiating polymerization. (3)

(b) Enumerate cationic polymerization and its chemical kinetics. (6)

OR

(b) Elaborate mechanism of free radical addition polymerization and its chemical kinetics. (6)

Q-5 (a) Discuss in detail kinetics of catalyzed and non-catalyzed polycondensation reaction. (6)

(b) Describe bulk and solution polymerization techniques with advantages and disadvantages (6)

OR

(b) Describe emulsion polymerization technique and chemical kinetics with its advantages and disadvantages (6)

Q-6 (a) Derive the copolymer equation for monomers M_1 and M_2 in terms of concentration and molefraction with usual notations. (6)

(b) Outline methods for determination of reactivity ratios. (6)

OR

(b) What is aging? Why aging occurs? What happens during aging? Discuss anti-aging additives. (6)