

(38) Seat No.: _____

No. of printed pages: 2

SARDAR PATEL UNIVERSITY

M.Sc. (Polymer Science & Technology) Semester-I Examination-2016

Saturday, 22nd October-2016

10:00 A.M. to 01:00 P.M.

PS01CPST10: BASIC CONCEPT IN POLYMER SCIENCE

Total Marks: 70

- Note: (1) Attempt all questions.
(2) Figures to the right indicate marks.

Q. 1 Answer the following multiple choice questions.

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- (a) $\frac{\overline{M_w}}{\overline{M_n}}$ _____ 1.
(1) > (2) < (3) = (4) \geq
- (b) Depolymerization means _____ of zip.
(1) closing (2) opening (3) locking (4) all.
- (c) _____ can be shaped into hard and tough utility articles by application of heat and pressure.
(1) fibre (2) elastomer (3) plastics (4) liquid
- (d) _____ decompose and produces free radicals.
(1) phenol (2) styrene (3) diethyl triamine (4) benzoyl peroxide.
- (e) Water insoluble monomers are used in _____ polymerization technique.
(1) suspension (2) emulsion (3) solution (4) both 1 & 2.
- (f) A polymer with back bone chain made up of different types of atom is known as _____ polymer.
(1) homo chain (2) hetero chain (3) addition (4) condensation.
- (g) _____ recycling can be defined as second hand use.
(1) 1⁰ (2) 2⁰ (3) 3⁰ (4) 4⁰
- (h) Sorting of plastic can be done by _____ technique.
(1) X-ray fluorescence (2) float and sink (3) IR (4) all of above

Q. 2

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- Attempt **any seven** of the following.
- (1) Define co-polymer. Explain each types of co-polymers.
 - (2) Enlist various classifications of polymers.
 - (3) Explain natural polymers with examples and limitations.
 - (4) Bulk polymerization technique produces highly pure polymers. Justify.
 - (5) How different types of polymers can be synthesized by polycondensation reaction? Explain.
 - (6) Calculate root mean square average for a given polyethylene polymer. The distance between two carbons is 0.170 and the polymer contains 2400 polyethylene segments.

- (7) A suspension contains equal number of particles with molecular weight 10,000 and 20,000. Calculate polydispersity.
- (8) Explain sorting of plastics based on their identification code.
- (9) Why polymer use has been so increased? Explain its waste management strategy.

Q. 3 (a) Differentiate following. 06
1. Simple molecule and polymer molecule.
2. Thermoplastic polymers and thermosetting polymers.

(b) Write a note on stereo regular polymers. 06

OR

(b) Describe size of polymer molecules. 06

Q. 4 (a) Explain following polymerization technique. 06

1. Suspension polymerization.
2. Emulsion polymerization.

(b) Discuss in detail about ionic polymerization. 06

OR

(b) What do you mean by Co-ordination polymerization? Discuss in detail about Co-ordination polymerization based on Ziegler-Natta catalyst. 06

Q. 5 (a) Discuss in detail about thermal degradation. 06

(b) Define Oxidative degradation. Describe mechanism of rubber oxidation. 06

OR

(b) Explain following. 06

1. Degradation by high energy radiation.
2. Random degradation.

Q. 6 (a) Explain in detail about washing and size reduction of polymer waste and contaminants removal from it. 06

(b) Give an account on chemical recycling with suitable examples. 06

OR

(b) What is quaternary recycling of polymer waste? Explain any two methods. 06

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