

Seat No.:

No of printed pages: 03

[24/A-4]

SARDAR PATEL UNIVERSITY
M.Sc. – Chemistry (First Semester) (CBCS)
Polymer Chemistry
Course No: PS01ECHE01
Friday, 28th October, 2016

Time: 10:00 a.m. to 01:00 p.m.

Total Marks: 70

Que.1 Select correct answer of the followings (08)

- 1 Which of the following statement is true
(A) Solid benzene directly convert into gaseous benzene by applying heat
(B) Polymerization of benzene takes place
(C) Polyethylene melt sharply at one particular temperature into a clean liquid
(D) Heating of hot viscous and molten polyethylene does convert into various gases but no longer polyethylene.
- 2 Which of the following pair is not correct for Ziegler-Natta catalyst and co-catalyst respectively?
(A) $VCl_3 : (C_2H_5)_2AlCl$ (B) $(C_4H_9)Li : TiCl_4$
(C) $TiCl_3 : (C_4H_9)MgI$ (D) All are correct
- 3 Which of the following is hardly undergoing ring opening polymerization?
(A) Three member ring systems (B) Four member ring systems
(C) Six member ring systems (D) seven member ring systems
- 4 The reinforcing filler commonly used in rubber is
(A) Graphite (B) Activated carbon
(C) Carbon black (D) Charcoal
- 5 Which one of the methods gives number average molecular weight?
(A) Vapour pressure osmometry (B) Membrane osmometry
(C) Cryoscopy (D) All are correct
- 6 In which polymerization technique viscosity of the medium does not increase throughout the polymerization
(A) Bulk polymerization
(B) Solution polymerization
(C) Suspension polymerization
(D) Emulsion polymerization
- 7 Termination under control condition sometimes does not occur in
(A) Anionic polymerization (B) Cationic polymerization
(C) Free radical polymerization (D) Coordination polymerization
- 8 Camphor, dibutyl phthalate, tricresyl phosphate are all examples of
(A) Antioxidants (B) Plasticizers
(C) Curing agents (D) UV stabilizers

- Que.2** Attempt any **SEVEN** of the following (14)
- 1 Write thermodynamics aspects of polymerization?
 - 2 Show that during polymerization reaction propagation step is the first order reaction with respect to monomer concentration and half order reaction with respect to initiator concentration.
 - 3 Write limitations of cryoscopy?
 - 4 Write IUPAC name, repeating unit and name based on chemical structure of Mylar (film)?
 - 5 What is an antioxidant? Give its two examples with structure?
 - 6 Write disproportionation reaction for polyethylene by free radical polymerization?
 - 7 Define *Flory's* solvent and *Flory's* temperature.
 - 8 Why styrene is chosen as standard for Q-e scheme and write its Q and e values?
 - 9 Write thermal decomposition reaction of Azo-bis-isobutylnitrile and benzoyl peroxide?

- Que.3** A Enlist the methods to determine weight average molecular weight. Discuss in detail sedimentation - velocity method for determining weight average molecular weight. (06)
- B (1) Insulin, a hormone that carbohydrate metabolism in the blood, was isolated from a pig. A 0.200 g of sample of insulin was dissolved in 25.0 mL water at 30°C and at the osmotic pressure of the solution was found to be 26.1 torr. What is the molecular weight of the insulin? (03)
- (2) Determine the molecular weight of a polystyrene sample which has an 'a' value of 0.60, a K value of 1.6×10^{-4} dL/g, and a limiting viscosity number or intrinsic viscosity of 0.04 dL/g. (03)

OR

- B (1) Determine the contour length of a polyethylene chain 1300 ethylene units long given the average zigzag distance between carbon atoms of 0.126 nm. (03)
- (2) The intrinsic viscosity of myosin is $217 \text{ cm}^3\text{g}^{-1}$. Calculate the approximate concentration of myosin in water, which would have a relative viscosity of 1.5. (03)

- Que.4** A Show generalized scheme for the anionic polymerization. Show anion chain growth by a dianion initiator species for anionic polymerization. (06)
- B Describe kinetics of chain polymerization by free radical. Obtain expression for rate of polymerization and degree of polymerization. (06)

OR

- B What is co-ordination polymerization? Why co-ordination polymerization is known as insertion polymerization? How co-ordination mechanism can be used to formulate highly stereo-regular polymers? (06)