SC

[43] SEAT No._____ *No. of Printed pages: [3]*

SARDAR PATEL UNIVERSITY

M. Sc. Chemistry, First semester Examination,
Course No.: PS01ECHE01, Polymer Chemistry,
Tuesday, 30th October-2018, 10:00 am to 01:00 pm

Total Marks: 70

Q. 1. Answer by highlighting an appropriate option. **[8]**

i. In suspension polymerization, the initiator is_____
   (a) Soluble in monomer (b) Soluble in water
   (c) Soluble in both (d) Insoluble in both

ii. If $r_1 = r_2 = 0$, $r_1 r_2 = 0$ then the type of copolymerization is_____
   (a) Random (b) Alternating
   (c) Ideal (d) All of the above are same

iii. The polystyrene has a weight average molecular weight of 120000 and a polydispersity of 1.2. What is the number average molecular weight?
   (a) 5,00,000 (b) 1,000
   (c) 1,00,000 (d) 10,00,000

iv. A copolymer can be formed by _____
   (a) Mixing two different polymers (b) Polymerizing two identical monomers
   (c) Mixing two identical polymers (d) Polymerizing two different monomers

v. The ratio of η / η_o is_____
   (a) Relative viscosity (b) Inherent viscosity
   (c) Specific viscosity (d) Intrinsic viscosity

vi. For polymer solubility of molecules A in solvent B is_____.
   (a) $F_{AB} \leq F_{AA}$ (b) $F_{AA} \leq F_{AB} \geq F_{BB}$
   (c) $F_{AA} \geq F_{AB}$ (d) None of the above

vii. Living anionic polymerization can be conveniently used to produce
   (a) Thermosets (b) Homopolymers
   (c) Block copolymers (d) None

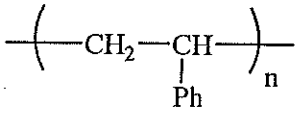
viii. The stereoregular polymer is obtained by _____.
   (a) Coordination polymerization (b) Insertion polymerization
   (c) Sandwich type polymerization (d) All of the above

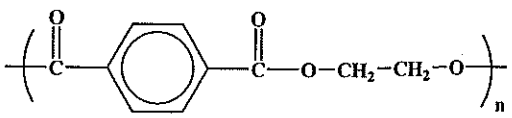
[P.T.O.]

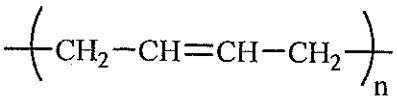
1

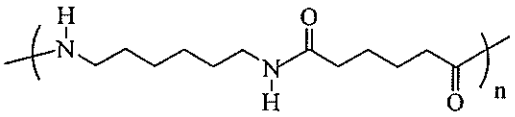
Q. 2. Attempt any *Seven* **[14]**

1. What is the molecular weight of polypropylene, when its degree of polymerization is 1000?
2. Write disproportionation reaction for polyethylene by free radical polymerization?
3. Define glass-transition temperature.
4. Differentiate: Thermoplastics and thermosetting polymers.
5. What happens during aging of polymers?
6. "Each droplet behaves as bulk polymerisation system in suspension polymerisation" Explain.
7. Calculate $\bar{M}_n$ of unsaturated polyester resin having –COOH group on one side and other side –OH group. If it's acid value is 28mg of KOH/gm.
8. Fibres are incorporated in resins why?
9. Identify the following polymers which are addition polymers and condensation polymers?

a) 

b) 

c) 

d) 

Q. 3.

[A]. Answer the followings:

1. Find the osmotic pressure of a solution of 1.0gm Glucose ($C_6H_{12}O_6$) in 1000 cm^3 of water at 1 atmosphere and 25^0C. [R= 82.06 cm^3. atm. $mole^{-1}$. deg^{-1}] **[3]**
2. Draw only the schematic diagram of high speed membrane osmometry (HSMO). **[3]**

[B]. Discuss the vapour pressure method for determination of molecular weight of polymer. **[6]**

OR

[B]. Show the structure of repeating units in: (**a**) HDPE, (**b**) Polystyrene, (**c**) PVA, (**d**) Perspex, (**e**) Polyacrylamide, (**f**) Teflon **[6]**

Q. 4.

[A]. Give a brief account on bimetallic mechanism due to Natta for the synthesis of the stereo-regular polymers. **[6]**

[B]. Explain mechanism of anionic polymerization initiated by sodium-naphthalene complex. **[6]**

OR

[B]. Write methods of initiating free radical polymerisation. **[6]**

Q. 5.

[A]. Describe the kinetics of catalyzed and non-catalyzed polyesterification. **[6]**

[B]. Describe the Q-e scheme proposed by Alfrey and Price. **[6]**

OR

[B]. Discuss ring opening polymerization with a suitable example. **[6]**

Q. 6.

[A]. **Write about following additives.**

1. Plasticizers **[3]**
2. Fillers **[3]**

[B]. Describe suspension polymerization technique. **[6]**

OR

[B]. Discuss thermodynamics of polymer solubility. **[6]**

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