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[97/A-19]

SEAT No._____ No. of Printed Pages : 3

SARDAR PATEL UNIVERSITY

1st Semester (NC), M.Sc. Chemistry **Examination** (CBCS)

Wednesday, **Date:** 27/03/2019 (March); **Time:** 10:00a.m. To 01:00p.m.

Subject: Polymer Chemistry **Paper code:** PS01ECHE01 **Total Marks:** 70

N.B.: i) Figures to the right indicate full marks.
ii) Assume the suitable data if necessary and indicate clearly.

Q. 1. Answer highlighting the appropriate option : **[8]**

i. The process of vulcanization of rubber was introduced by_____
(a) Charles Goodyear (b) MRF
(c) Zeigler (d) Wohler

ii. What is the weight average molecular weight, if polymer has a number average molecular weight of 100000 gm/mole and a polydispersity of 5 ?
(a) 20,000 (b) 500,000
(c) 100,000 (d) None

iii. Teflon is a polymer made of _____
(a) tetrachloroethylene (b) tetrabromoethylene
(c) tetrafluoroethylene (d) tetraiodoethylene

iv. The free radical polymerization is initiated by_____
(a) anion (b) cation
(c) coordination complex (d) free radical

v. Dioctylphthalate is an example of a _____
(a) plasticizer (b) antioxidant
(c) curing agent (d) uv-stabilizer

vi. In emulsion polymerisation the initiator is _____
(a) soluble in monomer (b) soluble in water
(c) insoluble in both (d) None of these

vii. Which of the following techniques doesn't depend on a colligative property?
(a) Cryoscopy (b) Membrane osmometry
(c) Viscometry (d) VPO

viii. The determination of $\bar{M}_w$ from light scattering involves a double extrapolation on the same graph. This grid like figure is called _____
(a) mol. wt. distribution curve (b) chromatogram
(c) turbidity plot (d) zimm plot

(P.T.O.)

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

1. Differentiate Thermoplastic and Thermosetting polymers.
2. Why is the termination process not preferred through coupling in cationic polymerization?
3. Softening temperature of Nylon-6,6 is higher than that of Nylon-6,10, why?
4. Write limitations of cryoscopy.
5. Define the terms: monomer and polymer.
6. Plasticizers make the polymer flexible and rubbery. Justify.
7. Give the advantages and disadvantages of bulk polymerization.
8. Show the structure of repeating units in: (a)Teflon, (b) HDPE, (c) PS, (d) PVC
9. What is the molecular weight of polypropylene, when its degree of polymerization is 1500?

Q. 3. Answer the following :

[A]. Attempt any two : [6]

1. Explain: Boiling point of solution is increased when non volatile solute is added to it.
2. Equal number of moles of polymers with M_1=**10,000** gm/mole and M_2=**1,00,000** gm/mole are mixed. Calculate $\bar{M}_n$, $\bar{M}_w$ and polydispesity index.
3. Write only three differences between Ostwald and Ubbelohde viscometers.

[B]. Describe Vapor phase osmometry. [6]

OR

[B]. Classify polymers by giving suitable examples based on (i) Composition, (ii) Tacticity. [6]

Q. 4. Answer the following :

[A]. Attempt any two : [6]

1. Write methods of initiating polymerization.
2. Give the salient feature of anionic polymerisation.
3. Explain chain-growth polymerization and step-growth polymerization.

[B]. Describe cationic polymerization and its chemical kinetics. [6]

OR

[B]. Explain in detail about Ziegler - Nata catalysts. [6]

Q. 5. Answer the following :

[A]. Attempt any two : [6]

1. Gives the salient features of suspension & emulsion polymerization.
2. Show ring opening polymerisation of oxirane ring.
3. Explain: solution polymerization.

[B]. Write a detail account on polycondansation reaction describing mechanism of polyester formation. [6]

OR

[B]. Give the merits and demerits of bulk, solution, suspension and emulsion polymerization. [6]

Q. 6. Answer the following :

[A]. Give an account of anti-aging additives with examples. [6]

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

OR

[B]. **Answer the following :** [6]

1. Explain: Organometallic polymers.
2. Explain: Plasticizers.

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