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AI—307—2017

FACULTY OF SCIENCE

M.Sc. (Second Year) (Third Semester) EXAMINATION

MARCH/APRIL, 2017

(CBCS Pattern)

ORGANIC CHEMISTRY

Paper XVIII (CH-534/3B)

(Polymer Chemistry-I)

(Thursday, 27-4-2017)

Time : 2.00 p.m. to 5.00 p.m.

Time— Three Hours

Maximum Marks—75

N.B. :— (i) Attempt All questions.

(ii) Figures to the right indicate full marks.

1. Solve any *three* of the following : 15

(a) Explain the mechanism of cationic polymerisation.

(b) Explain hydrolysis reaction of polyamide and polyvinyl acetate.

(c) Explain mathematically number average and weight average molecular weight of polymer.

(d) What is chain flexibility ? On which factors does it depend ?

(e) Describe hand-lay-up technique for producing reinforced plastic articles.

2. Attempt any *three* of the following : 15

(a) Define different types of copolymers.

P.T.O.

- (b) Describe osmotic pressure method for the determination of molecular weight of polymer.
- (c) Explain film casting technique in the production of polymeric film.
- (d) Comment on wet spinning process in the formation of polymer.
- (e) What short of comonomer could be used to raise the glass transition temperature of poly (vinylacetate) ?
3. (A) What is polymerisation ? Explain the mechanism of coordination polymerisation. 8

Or

Draw structural formulas indicating the stereoregular chain configuration in :

- (i) Atactic polystyrene
- (ii) Isotactic polypropylene.
- (B) Comment in detail the process of “Blow moulding”. 7

Or

Discuss the structure of solution glow polyethylene single crystals.

4. (A) Show how NMR can be used to distinguish between head to head and head to tail polymerisation in polymers. 8

Or

What are elastomers ? Describe the properties and uses of elastomers.

- (B) How are polymers classified ? 7

Or

Differentiate between differential scanning calorimetry (DSC) and differential thermal analysis (DTA).

5. (A) Select the *correct* alternative of the following : 5
- (i) In emulsion polymerisation the product is obtained in the form of..... .
- (a) Slurry mass (b) Latex
(c) Bead (d) Pearls
- (ii) The light scattering phenomenon is used to measure the..... .
- (a) No. average mol.wt.
(b) Wt. average mol. wt.
(c) Viscosity average mol. wt.
(d) Z-average mol. wt.
- (iii) Terminal functional groups on the polymer molecules is detected by..... .
- (a) Osmotic pressure method
(b) Light scattering method
(c) End group analysis method
(d) Ultracentrifugation method
- (iv) The properties of a polymer such as density, modulus, hardness, permeability affected by its..... .
- (a) Diffusibility (b) Crystallinity
(c) Solubility (d) None of these

P.T.O.

(v)are used for making carpets, curtains, seat covers etc.

- (a) Comfort fibres
- (b) Industrial fibres
- (c) Safety fibres
- (d) None of the above

(B) Write short notes on any *two* : 10

- (i) Tensile strength and impact strength
- (ii) Polymer tacticity
- (iii) Plastics.