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CHS 555

**IV Semester M.Sc. Degree Examination, Sept./Oct. 2022
(CBCS – 2016-17 Syllabus) (Freshers and Repeaters)**

**CHEMISTRY
Polymer Chemistry**

Time : 3 Hours

Max. Marks : 70

Note : i) Answer Part – **A** and **any four** questions from Part – **B**.
ii) Figures to the **right** indicate marks.

PART – A

1. Answer **all** subdivisions. **(2×9=18)**
- a) What are polymers ? How are they formed ?
 - b) Calculate the average degree of polymerization of a nylon-6 sample with average molecular weight of 3.39×10^4 .
 - c) Write the structure of repeating unit of the following polymers :
 - i) Polyisoprene
 - ii) Poly (methacrylic acid)
 - iii) Kevlar
 - iv) Teflon.
 - d) Differentiate between addition and condensation polymers with two examples for each class.
 - e) Among polyethylene and PVC which polymer exhibits higher T_g ? Why ?
 - f) Give the relation between osmotic pressure of polymer solution and molecular weight of polymer. Mention the terms involved.
 - g) List the properties and uses of polystyrene.
 - h) Illustrate oxidative degradation in polymers with an example. How such reactions can be minimised ?
 - i) What are polymer composites ? Mention their uses.

P.T.O.



PART – B

Answer **any four** of the following.

(4×13=52)

2. a) Discuss the kinetics of copolymerization and mention the conditions for obtaining 7
i) alternating and
ii) random copolymers.
- b) Describe the following techniques of polymerization : 6
i) emulsion polymerization and
ii) melt polycondensation.
3. a) Discuss the kinetics of free radical polymerization reaction. 5
b) Discuss the classification of polymers. 5
c) Write a note on crosslinked polymers. 3
4. a) Explain the ultracentrifugation method of determination of molecular weight in polymers. 7
b) Discuss the factors affecting T_g and T_m in polymers. 6
5. a) Explain stereoregularity in polymers with suitable examples. 6
b) Write a note on molecular weight averages in polymers. 4
c) Give the principle of DTG technique of characterization of polymers. 3
6. a) With a neat diagram describe the principle of the following techniques of polymer processing :
i) extrusion moulding and
ii) calendaring. 6
b) Write a note on recycling technique of plastic waste management. 4
c) Explain the mechanism of thermal degradation in PVC. 3
7. a) Discuss the preparation, properties and applications of polyurethanes. 6
b) Write a note on conducting polymers. 4
c) Explain uses of polymers in medical field with examples. 3
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