UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 6th Semester Examination, 2023

DSE-P3-CHEMISTRY

POLYMER CHEMISTRY

Time Allotted: 2 Hours   Full Marks: 40

The figures in the margin indicate full marks.

1. Answer any *five* questions from the following: 1×5 = 5

   (a) What is polydispersity index?

   (b) Write two differences in between addition polymerization and condensation polymerization.

   (c) What is modifier in polymer chemistry?

   (d) What is the significance of 6 in nylon 66 polymer?

   (e) What is the conducting polymer?

   (f) Rice is an example of biodegradable polymer. — Explain.

   (g) What is thermosetting polymer? Give example.

   (h) Yolk of boiled egg is an example of thermosetting polymer. Justify or criticize.

2. Answer any *three* questions from the following: 5×3 = 15

   (a) (i) What is living polymers and why it so called? What are its applications?   2+1+2

        (ii) What is oligomers?

        (iii) All polymers are macromolecules but reverse is not true. — Justify.

   (b) How molecular weight of a polymer could be determined by Viscometric method?   5

   (c) What is vulcanization? How it could be done? What is the advantages of this process in polymer chemistry?   5

   (d) (i) What is the basic differences between homopolymer and copolymer? Explain with examples.   3+2

        (ii) What is degree of polymerization?

3.   Answer any *two* questions from the following: 10×2 = 20

(a) (i)   How is polyurethane prepared?   2+3+2+3

(ii)   Write down the differences between homopolymer and heteropolymer.

(iii)   What do you mean by weight average molecular weight $(\overline{M}_N)$?

(iv)   Write a short note on Buna-S-rubber.

(b) (i)   Discuss the properties and applications of polytetrafluoroethylene (PTFE).   (2+2)+3

(ii)   What is pheno-formaldehyde resins?   +1+2

(iii)   Give one example of conducting polymer.

(iv)   How Nylon 6,6 is prepared?

(c) (i)   Discuss the mechanism of polymerization of styrene monomer using benzoyl peroxide as the initiator.   5+3+2

(ii)   In a given sample of polymer, there are 100 molecules with molecular weight 10^3, 200 molecules with molecular weight 10^4 and 200 molecules with molecular weight 10^5. Find out the number average molecular weight and weight average molecular weight.

(iii)   What are basic differences between 'mer' and 'monomer' in polymer chemistry?

(d) Write short notes on (any *four*): $2\frac{1}{2} \times 4 = 10$

(i)   Kinetic chain length

(ii)   Free radical polymerization

(iii)   Neoprene

(iv)   Graft polymer

(v)   Tacticity.

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