

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted from the academic year 2019-20 & thereafter)

B.Sc. DEGREE EXAMINATION, APRIL 2024
BRANCH IV – CHEMISTRY
FOURTH SEMESTER

COURSE : MAJOR-ELECTIVE
PAPER : POLYMER CHEMISTRY
SUBJECT CODE : 19CH/ME/PL45
TIME : 3 HOURS **MAX. MARKS: 100**

SECTION – A

Answer all the questions: (30x1=30)
Choose the correct answer:

1. Which of the following polymers are thermoplastic?
a) Natural rubber b) Teflon c) Neoprene d) Natural fiber
2. Vulcanization makes rubber _____
a) Soluble in organic solvent b) Soluble in inorganic solvent
c) Crystalline d) More stiff
3. Cellulose diacetate is obtained by acetylation of cellulose with _____ in acidic medium
a) CH_3COOH b) CH_3CONH_2 c) $(\text{CH}_3\text{CO})_2\text{O}$ d) $\text{CH}_3\text{COOC}_2\text{H}_5$
4. The polymer having strong intermolecular forces
a) PVC b) Polyesters c) Rubber d) Polystyrene
5. Which of the following monomers form biodegradable polymers?
a) Isoprene b) Glycine + amino caproic acid
c) Ethylene glycol + phthalic acid d) Caprolactum
6. Which polymerization technique use Surfactants
a) Bulk b) Suspension c) Emulsion d) Solution
7. Type of polymer which cannot crystallize easily
a) Isotactic b) Syndiotactic c) Atactic d) All of these
8. What is the size of the monomer droplets in suspension polymerisation?
a) 25-30mm b) 50-60 mm c) 15-20mm d) 0.1-5mm
9. Which of the following does not undergo addition polymerization?
a) Vinyl chloride b) Dicarboxylic acid c) Butadiene d) Styrene
10. End group analysis gives _____
a) \bar{M}_n b) \bar{M}_w c) \bar{M}_g d) \bar{M}_v

Fill in the blanks:

11. The commercial name of polyacrylonitrile is _____
12. PMMA is the acronym for _____
13. Compound containing _____ undergo chain polymerization reaction
14. Natural rubber consists of _____ molecule
15. Glass transition temperature of rubber is _____ polymer
16. Polyvinyl acetate is hydrolyzed with an alkali to give _____
17. Splitting of the polymer molecule with an amine is called _____
18. Thermosetting polymer manufactured by _____ polymerization
19. Chemical cross linking through covalent bond is _____
20. Important prepolymer used in high energy propellants _____

Match the following:

- | | | |
|-------------------|---|------------------------------|
| 21. Buna S | - | a) Surface coatings |
| 22. Bakelite | - | b) Synthetic fibers |
| 23. Teflon | - | c) Shock absorbance material |
| 24. Polystyrene | - | d) Automobile tyre |
| 25. Polyacrylates | - | e) Non-Stick Cookwares |

Answer in one or two lines:

26. What are synthetic polymers?
27. Define the term 'homopolymerisation' giving an example.
28. Write the two methods used in gas phase polymerization.
29. Explain the term 'Graft copolymer'.
30. What is biodegradable polymer? Give an example of a biodegradable polymer.

SECTION – B**Answer any five Questions:****(5x6=30)**

31. How are polymers classified?
32. Write the structure and applications of polyvinylchloride, polyacrelates and polymethylmethacrelate.
33. Differentiate between addition and condensation polymerization.
34. Compare bulk and solution polymerization technique by giving examples.
35. Explain number-average and weight-average molecular weight of a polymer.
36. Describe the addition and Substitution reactions of polymers.
37. What is polymer degradation? Explain photo degradation of polymer with example

SECTION – C**Answer any two questions:****(2x20=40)**

38. (i) Differentiate between natural and synthetic fibers. Write the preparation, properties and uses of Nylon 6,6. (2+8)
- (ii) Describe anionic and cationic polymerization with example. (5+5)
39. (i) What is glass transition temperature? Explain the factors affecting it and its importance. (2+8)
- (ii) Explain the polymer reaction: hydrolysis and acidolysis with example. (5+5)
40. (i) Discuss the structure and uses of Buna N, Buna S and neoprene rubber. (6)
- (ii) Explain vulcanization with an example (4)
- (iii) Give the mechanism of coordination polymerization (10)
