

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted from the academic year 2019-20 & thereafter)
SUBJECT CODE: 19CH/ME/PL45
B.Sc. DEGREE EXAMINATION, APRIL 2023
BRANCH IV – CHEMISTRY
SIXTH SEMESTER

COURSE : MAJOR-ELECTIVE
PAPER : POLYMER CHEMISTRY
TIME : 3 HOURS

MAX. MARKS: 100

SECTION – A

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

- If M_w is the weight average molecular weight and \bar{M}_n is the number of average molecular weight of a polymer, the poly dispersity index (PDI) of the polymer is given by
a) $\frac{\bar{M}_n}{M_w}$ b) $\frac{\bar{M}_w}{M_n}$ c) $\bar{M}_w \times \bar{M}_n$ d) $\frac{1}{\bar{M}_w \times \bar{M}_n}$
- Which of the following statement is false?
a) The repeat unit in natural rubber is isoprene
b) Both starch and cellulose are polymers of glucose
c) Artificial silk is derived from cellulose
d) Nylon-6,6 is an example of elastomer
3. What is the glass transition temperature of the polymer polymethyl methacrylate?
a) 74° C b) 105° C c) 93° C d) 80° C
4. What is the size of the monomer droplets in suspension polymerisation?
a) 25-30mm b) 0.1-5mm c) 15-20mm d) 50-60 mm
5. Which of the following polymerization mechanism can polymerize the styrene monomer?
a) radical polymerization b) anionic polymerization
c) cationic polymerization d) all of the mentioned
6. Which of the following kind of polymers are known for their high crystallinity?
a) isotactic b) syndiotactic c) atactic d) none of the mentioned
7. which of the following has the highest practical utility as an inhibitor
a) Benzoquinone b) T-butyl catechol c) nitro benzene d) DPPH
8. Which one of the following is a branched polymer
a) Low-density polymer b) Polyester c) High density polymer d) nylon
9. How is the solvent in solution polymerisation, more useful to overcome the disadvantages of bulk polymerisation
a) It reduces the viscosity gain b) increases the rate of the reaction
c) Causes chain transfer d) All

Fill in the blanks:

- The commercial name of polyacrylonitrile is _____.
- A plastic used for making crockery is _____
- PET is the acronym for _____

State whether true or false:

13. The kinetic chain length represents the average number of monomer molecules in a polymer molecule
14. Degradable plastics break down into tiny pieces called microplastics.

Match the following:

- | | | |
|------------------------|-------|---------------------|
| 15. Polystyrene | (i) | Paints and lacquers |
| 16. Glyptal | (ii) | Rain coats |
| 17. Polyvinyl Chloride | (iii) | Manufacture of toys |
| 18. Bakelite | (iv) | Computer discs |

Answer in one or two lines: (6x2=12)

19. Name of compound/compounds used in preparation of nylon-66.
20. How is Terylene prepared?
21. What are thiokols? give examples.
22. What are silicones?
23. Mention any two applications of vulcanisation.
24. List any two differences between thermo and thermo setting plastics.

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

25. Differentiate elastomers and fibres.
26. Explain number-average and weight-average molecular weight of a polymers.
27. What is glass transition temperature? List out the importance of glass transition temperature
28. With suitable example, explain coordination polymerisation
29. What is meant by thermal degradation of polymers? What are the factors responsible for polymers to undergo thermal degradation?
30. Write briefly about bio degradable polymers
31. Describe the preparation, properties and uses of polyester

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

32. a) What is meant by polymer crystallinity? Write their importance. (5)
 b) Explain photodegradation of polymers. (5)
 c) Discuss cyclisation reactions of polymers (5)
 d) Discuss the preparation and properties of graft copolymers (5)
33. a) Give a brief account on solution polymerisation technique. (5)
 b) Describe the preparation, properties and uses of nylon (5)
 c) Explain the free radical polymerisation mechanism of vinyl compound. (5)
 d) Distinguish between addition and condensation polymerisation with suitable examples. (5)
34. a) Explain the following reactions with examples:
 (i) acidolysis (ii) Hydrolysis (iii) Hydrogenation (iv) Substitution reactions. (8)
 b) Discuss the chemistry involved in the cationic and anionic polymerisation reactions with mechanism (8)
 c) Write an account on silicones (4)