

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted from the academic year 2010-11)

SUBJECT CODE: CH/ME/PL24

B.Sc. DEGREE EXAMINATION, APRIL 2011
BRANCH IV - CHEMISTRY
SECOND SEMESTER

Reg. No

COURSE : MAJOR ELECTIVE
PAPER : POLYMER CHEMISTRY
TIME : 30 MINUTES

MAX. MARKS : 30

SECTION – A

TO BE ANSWERED ON THE QUESTION PAPER ITSELF.
ANSWER ALL THE QUESTIONS.

(30x1=30)

I. Choose the correct answer:

30 x 1 = 30

- Which among the following is not a natural polymer
a) Silk b) Wool c) rubber d) Nylon
- Adipic acid reacts with hexamethylene diamine to form
a) Nylon 6 b) Nylon 6,6 c) Terylene d) Dacron
- Acrylonitrile is
a) $\text{CH}_2 = \text{CHNO}_2$ b) $\text{CH}_2 = \text{CHCN}$ c) $\text{CH}_2 = \text{CHC}_5\text{H}_4\text{N}$ d) $\text{CH}_2 = \text{C}(\text{CH}_3)\text{CN}$
- DPPH is a
a) Intitation b) Chain transfer agent c) Inhibition d) stabilizer
- The rate of polymer formation in free radical chain polymertisation is propotional to the
a) 1st power of monomer concentration c) Independent of monomer concentration
b) Square root of monomer concentration d) 2nd power of monomer concentration
- The possible configuration of butadiene molecule is
a) 1 b) 2 c) 3 d) 4
- Proteins are
a) Polyols b) polyamides c) polyesters d) polyurethanes
- Which among the following is used in contact eye lens
a) PMMA b) PVA c) PETP d) PVC
- The name rubber was given by
a) John Priestely b) F.S. Kipping c) W.H. Carothers d) H.Shiva
- Ultrasound degradation is a special class of
a) Thermal b) photo c) Mechanical d) Chemical Degradation

II. Fill in the blanks:

11. AIBN is expanded as _____.
12. The Tg of natural rubber is _____.
13. The maximum crystallinity that a polymer can achieve at a particular temperature is its _____.
14. Polyacrylonitrile upon heating cyclises to form _____.
15. Styrene when polymerised with small amounts of divinyl benzene results in _____.
16. Polydispersity index is given as _____.
17. Atactic polymers have _____ melting points.
18. Polyvinyl acetate on acidolysis gives _____.
19. Tg value will be _____ for the low molecular weight polymers.
20. Polyethylene is thermally _____ stable than polypropylene.

III. State True / False:

21. The orderly regions in a polymeric substance are called crystallites.
22. Vulcanisation is a cyclisation process.
23. Polymer chains containing amide groups can undergo hydrolytic degradation.
24. Random degradation is a reverse of polycondensation process.
25. Footwear soles use PU.

IV. Match the following:

- | | | |
|---------------------------|---|------------------------|
| 26. Cellulose Acetate | - | PMMA |
| 27. Gutta Purcha | - | Photo degradation |
| 28. Long range order | - | Perchloric acid |
| 29. Yellowing of Plastics | - | Trans 1,4 polyisoprene |
| 30. Sign Boards | - | Crystalline polymers |

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TIME : 2½ HOURS

MAX. MARKS : 70

SECTION B

Answer any five questions:

5 x 6=30

1. a) Classify the following polymers on the basis of the action of heat on them
Bakelite, Nylon, Dacron, Polyethylene (4)
b) Mention any two industrial applications of PMMA (2)
2. Discuss the significance of Ziegler – Natta catalyst in polymerisation reaction
3. Write a brief note on stereochemistry of polymers.
4. Write the methods and mechanism of vulcanisation of rubber.
5. Discuss briefly the effect of crystallinity on the properties of polymers.
6. a) Equal masses of polymer molecules with $M_1 = 10,000$ and $M_2 = 100,000$ are mixed.
Calculate M_n and M_w .
7. Discuss cyclisation and crosslinking reaction with an example.

SECTION C

Answer any two questions:

2 x 20=40

8. a) Providing an example for the following types indicate the mechanism involved
(i) Addition polymerisation (ii) Cationic Polymerisation (7+7)
b) Discuss the need for recycling of polymers (6)
9. a) Explain the kinetics of free radical chain polymerisation (12)
b) Write notes on Block and Graft copolymers (8)
10. What is polymer degradation? Write notes on thermal & photodegradation (7+7)
b) Write notes on Biodegradable polymers (6)
11. a) What is meant by Heat distortion temperature & mention its importance (4)
b) Explain the following reactions of polymer with an example
i) Hydrolysis ii) Acidolysis iii) Aminolysis iv) Substitution (16)

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