C 20098 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION MARCH 2022

Chemistry

CHE 6B 13 (E2)—POLYMER CHEMISTRY

(2014 to 2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A (One word)

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Give an example for a copolymer.
2. Natural rubber is basically a polymer of ————.
3. The weight average and number average molecular mass of a polymer are respectively 40,000 and 30,000. The polydispersity index of the polymer will be ———— ?
4. Give an example for thermosetting plastic.
5. ———— is an example for inorganic polymer.
6. Mention one conductive polymer.
7. The glass transition temperature of natural rubber is ————.
8. Which polymer is sold under the trade name 'Saran".
9. Hollow plastic articles are generally produced by ———— moulding technique.
10. What is super glue ?

(10 × 1 = 10 marks)

Section B (Short answer)

Answer any **ten** *questions.*
Each question carries 2 *marks.*

11. What are the different steps in chain polymerisation ?
12. How are polymers classified according to their intermolecular forces present in it ?
13. Write short note on'Glyptal'.
14. Give any *two* applications of poly methyl methacrylate in medical field.

Turn over

15. What is the significance of polydispersity index.
16. Comment on the oxidative degradation of polymers.
17. What is the monomer of neoprene ?
18. Give two examples for fire resistant polymers.
19. What is 'melmac' ?
20. Give two examples for fibre forming polymers.
21. Mention the advantages of solution polymerisation.
22. What is interfacial polycondensation ?

(10 × 2 = 20 marks)

Section C (Paragraph)

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. What is condensation polymerisation? How is Nylon 6,6 prepared ?
24. Explain coordination polymerisation and its mechanism.
25. Briefly explain the preparation, structure and properties of carbon fibres.
26. Write short note on thermoforming.
27. Discuss plastic identification codes.
28. Write short note on Polyurethanes.
29. Mention important fire-resistant polymers. Discuss their applications.
30. Briefly explain the classification of polymers based on synthesis.

(5 × 6 = 30 marks)

Section D (Essay)

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. Briefly discuss the following polymer processing techniques : (a) Compression moulding ; (b) Injection moulding.
32. Explain the structure, properties and applications of : (a) PP ; (b) PVC ; (c) PMMA and (d) Teflon.
33. Write short note on : (a) Glass transition temperature ; (b) Applications of polymers in medical field.
34. Discuss the classification of polymers based on : (a) Synthesis ; (b) Structure ; and (c) intermolecular forces.

(2 × 10 = 20 marks)

C 20544 **(Pages : 2)** **Name.....**

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Chemistry

CHE 6B 13 (E2)—POLYMER CHEMISTRY

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. Differentiate between thermoplastic and thermosetting polymers. Give one example each.
2. What are Polymers ? How they are classified ?
3. Define the term 'chain growth' in polymerization. What are inhibiters. Give an example of an inhibitor.
4. Briefly explain on what is group transfer polymerization.
5. Explain the concept of ring opening in polymerisaton.
6. Briefly explain the phenomenon why a rubber ball becomes like glass below -70°C .
7. Briefly explain bulk polymerization? What is its major disadvantage.
8. What is HDPE ? Explain one method on how it is produced.
9. Explain why the melting point of polyurethane is much less than that of corresponding polyamide.
10. What is Teflon ? Mention its two applications
11. What is PVC ? Give one method for industrial polymerization of vinyl chloride.
12. What is EPDM rubber ? Give any *one* of its properties.

(8 × 3 = 24 marks)

Turn over

Section B (Paragraph)

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Explain how an ionic mechanism of chain polymerization takes place ?
14. Briefly explain the Zeigler Natta polymerization.
15. Briefly explain what is meant by molecular weight of a polymer and explain how degree of polymerization is expressed in terms of molecular weight.
16. Bring out any two key features of solution polymerization and suspension polymerization.
17. Write short note on interfacial condensation.
18. Briefly explain how phenol-formaldehyde resins are formed.
19. What are conducting polymers ? What is Dopping ?

(5 × 5 = 25 marks)

Section C (Essays)

Answer any **one** *question.*
The question carries 11 *marks.*

20. Write notes on thermal, photo and oxidative degradations of polymers.
21. Write notes on any *four* polymer processing techniques.

(1 × 11 = 11 marks)

C 40085 (**Pages : 2**) **Name**.....

Reg. No.....

SIXTH SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION
MARCH 2023

Chemistry

CHE 6B 13 (E2)—POLYMER CHEMISTRY

(2017–2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A (One word/Sentence)

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Give two examples for synthetic polymers.
2. _____ is an example for conducting polymer.
3. Hollow thermoplastic articles are generally produced by _____ moulding technique.
4. The non-stick layer of kitchenware contains _____ polymer.
5. Monomers are converted to polymers by _____ reaction.
6. _____ is an example of natural fibre.
7. Which polymer is used to make bullet proof glass ?
8. The primary substance used for vulcanising rubber is _____.
9. What is the glass transition temperature of polystyrene ?
10. What is Ziegler-Natta catalyst ?

(10 × 1 = 10 marks)

Section B (Short Answer)

Answer any **ten** *questions.*
Each question carries 2 *marks.*

11. How are polymers classified according to their origin ?
12. What is meant by group transfer polymerisation ?
13. Mention two applications of silicone rubber in medical field.
14. Briefly explain important applications of carbon fibre.
15. Give two examples for heat-resistant polymer.
16. What is lexan ?

Turn over

17. Give two applications of urea-formaldehyde resin.
18. What are the characteristic properties of Teflon ?
19. Write short note on 'Nomex'.
20. What is rotational moulding ?
21. Mention important manufacturing process for fibre.
22. What is suspension polymerisation ?

(10 × 2 = 20 marks)

Section C (Paragraph)

Answer any **five** *questions.*

Each question carries 6 *marks.*

23. With suitable examples, explain the difference between thermoplastics and thermosetting plastics.
24. What is Kevlar ? Explain its applications.
25. Briefly explain blow moulding technique.
26. Explain free radical chain polymerisation.
27. Write short note on nitrile rubber.
28. Briefly explain the pollution due to plastics.
29. Discuss the homo and hetero polymers with example.
30. Mention the differences between LDPE and HDPE.

(5 × 6 = 30 marks)

Section D (Essays)

Answer any **two** *questions.*

Each question carries 10 *marks.*

31. (a) Explain interfacial polycondensation polymerisation reaction with suitable example.
    (b) Discuss calendaring and thermoforming techniques for the manufacture of polymer products.
32. Briefly discuss the preparation, structure, properties and uses of (a) SBR and (b) Terylene.
33. Discuss the number average, weight average and viscosity average molecular weight of polymers in detail.
34. Write short note on :
    (a) Glass transition temperature.
    (b) Ring opening polymerisation and
    (c) Poly Dispersity Index.

(2 × 10 = 20 marks)

D 100085 (Pages : 3) Name.....

Reg. No.....

SIXTH SEMESTER U.G. (CUCBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry

CHE 6B 13 (E2)—POLYMER CHEMISTRY

(2018 Admissions only)

Time : Three Hours Maximum : 80 Marks

Section A (One word)

Answer **all** *questions.*

Each question carries 1 *mark.*

1. What are heteropolymers ? Give examples ?
2. Give an example for addition polymer.
3. Write any *two* advantages of Zeigler-Natta polymerization.
4. Define Glass Transition Temperature.
5. Write the equation for Number average molecular weight of polymers.
6. What are the advantages of vulcanisation ?
7. Discuss any *two* disadvantages of bulk polymerisation.
8. What is thermoforming ?
9. What is PMMA ?
10. Give an example of conducting polymer.

(10 × 1 = 10 marks)

Section B (Short Answer)

Answer any **ten** *questions.*

Each question carries 2 *marks.*

11. What do you mean by copolymer ? Illustrate with examples.
12. What is group transfer polymerization ?

Turn over

13. Write any two importance of T_g.

14. Define Poly dispersity index. What is its significance ?

15. What is auto acceleration ?

16. How calendaring is carried out ?

17. What is degree of polymerisation ? How it influences the molecular weight ?

18. How termination is carried out in free radical polymerisation ?

19. How will you prepare HDPE ?

20. What are silicone rubbers ? What are its uses ?

21. Draw the structure of glyptal. How it is prepared ?

22. Discuss the applications of carbon fibers.

(10 × 2 = 20 marks)

Section C (Paragraph)

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. Explain the classification of polymers based on their origin.

24 What is step growth polymerization ? What are its characteristics.

25. Write notes on the reactions involved in vulcanisation.

26. What is melt condensation polymerization ? What are its advantages ?

27. Discuss briefly plastic recycling process.

28. How phenol-formaldehyde resin is synthesised ? Explain its uses.

29. Write the synthesis, properties and applications of Kevlar.

30. Using suitable examples, write notes on the polymers used in medical field.

(5 × 6 = 30 marks)

Section D (Essay)

Answer any **two** *questions.*

Each question carries 10 *marks*

31. Discuss the mechanism of free radical addition polymerisation.

32. Explain briefly the different types of polymer degradation process.

33. Write notes on suspension and emulsion polymerisations.

34. What are conducting polymers? Explain the synthesis and applications of any two conducting polymers.

(2 × 10 = 20 marks)

D 100528 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. (CBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry

CHE 6B 13 (E2)—POLYMER CHEMISTRY

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

Answer questions up to 20 *marks.*

Each question carries 2 *marks.*

1. What are copolymers ? Give one example.
2. What is group transfer polymerisation ?
3. What do you understand by sedimentation average molecular weight ?
4. What is degree of polymerization ? How it is related to molecular weight of the polymer ?
5. What is unzipping of polymers ?
6. What do you understand by interfacial poly condensation polymerisation ?
7. Comment on the classification of polymers based on their structure.
8. Which catalyst is used in Zeigler-Natta polymerisation ? Write any *two* advantages of this polymerisation process.
9. Anionic polymerisation is known as living polymerisation. Why ?
10. Write the structural formula of PMMA and PAN.
11. How NR and Silicone rubber differ in vulcanisation process ?
12. What is meant by conducting polymer ? Give an example.

(Ceiling of marks : 20)

Turn over

Section B (Paragraph)

Answer questions up to 30 *marks.*
Each question carries 5 *marks.*

13. Write short notes on blow moulding and thermoforming.

14. Write a short note on emulsion polymerization.

15. What is the significance of average molecular mass for polymers ? Describe the concept of number average and weight average molecular mass.

16. What is glass transition temperature (T_g) ? Write any *two* factors affecting (T_g).

17. Explain : (a) Solution polymerization ; and (b) Suspension polymerization.

18. Comment on the preparation, structure, properties and applications of HDPE and LDPE.

19. What are recycling codes of plastics ? Explain with suitable examples. What is the significance of recycling ?

(Ceiling of marks : 30)

Section C (Essay)

Answer any **one** *questions.*
The question carries 10 *marks.*

20. Explain Free radical polymerization with mechanism using suitable example.

21. Write notes on :

    (a) Calandering.

    (b) Compression moulding.

    (c) Injection moulding.

    (d) Poly urethanes.

    (e) Polycarbonates.

(1 × 10 = 10 marks)