LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FOURTH SEMESTER – **APRIL 2023**

16UCH4ES02 – MATERIALS SCIENCE

Date: 06-05-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A

Answer ALL questions **(10 x 2 = 20 Marks)**

1. Write the preparation of silica nanoparticles.
2. What is photovoltaic effect?
3. State Curie Weiss law for ferromagnets.
4. Why metal oxides are better than the polymers for sensing applications?
5. Define oligomers.
6. What are elastomers?
7. How is polypropylene synthesized? Give its uses.
8. Mention the application of PMMA.
9. Write the advantages of bulk polymerization.
10. How is PTFE synthesized? Mention its applications.

PART – B

Answer any EIGHT questions **(8 x 5 = 40 Marks)**

11. What are CNTs? Explain the types of CNTs.
12. Discuss the role of p-n junction in rectifiers.
13. What are superconductors? Explain BCS theory of superconductors.
14. Explain the mechanism of detection of alcohols for n-type semiconductors.
15. Write a short note on optical and electrochemical biosensors.
16. Distinguish between hard and soft magnets.
17. Describe the step growth polymerization with two examples.
18. Explain solution polymerization technique.
19. How are Buna-S and Buna-N synthesized? Mention their application.
20. Write note on natural rubber.
21. Explain oxidative degradation of a polymer.
22. Describe the vulcanization of rubber?

PART – C

Answer any FOUR questions **(4 x 10 = 40 Marks)**

23. State the principle of TEM. Explain the instrumentation of TEM with a block diagram.
24. Why ferromagnets show hysteresis? Explain.
25. Discuss the mechanism of alcohol sensing for n-type and p-type semiconductors.
26. Explain the mechanism of free radical addition polymerization reaction.
27. a) Explain briefly the cationic polymerization technique with suitable example.
    b) Describe the calendaring polymer processing technique. (5 + 5)
28. a) Explain the synthesis of polyethylene by using Ziegler-Natta catalyst.
    b) How is nylon 66 synthesized? Give its uses. (6 + 4)

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