D4ACH2003 **(2 Pages)** **Name.....**
Reg.No.....

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2022
(Regular/Improvement/Supplementary)

CHEMISTRY
FCHE4E07 - MATERIAL SCIENCE

Time: 3 Hours **Maximum Weightage: 30**

Section A: Short answer questions. Answer any *eight* questions. Each carries *one* weightage.

1. Molecular self-assembly is a highly promising field of research in nanotechnology. Justify.
2. What are the applications of nanotechnology in targeted drug delivery?
3. Briefly explain two methods for the removal of pollutants from industrial exhausts.
4. What is template assisted synthesis of nanomaterials?
5. Elaborate on nano composites.
6. Distinguish between HTS and LTS in water gas shift reaction.
7. What is Mayo-Walling equation?
8. Why anionic polymerization is also called living polymerization?
9. What is the application of polymer in photoresists?
10. How the particle size affects the optical properties of Nanomaterials?
11. What are wave guide devices?
12. How the fatigue tests of polymers carried out?

(8 × 1 = 8 weightage)

Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

13. Write a note on graphenes.
14. How the microstructural features of fracture of composites differ from that of metals?
15. Explain the Q-e scheme for determination of the reactivity ratio.
16. Distinguish between the bottom up and top down method for synthesis of nanomaterials?

(P.T.O.)

17. How the interface modification carried out in polymer composites?

18. Give an account of polymer supported reagents.

19. What are conducting polymers? Give a short account on their applications using appropriate examples.

(4 × 3 = 12 weightage)

Section C: Essay questions. Answer any *two* questions. Each carries *five* weightage.

20. Give a detailed account on zeolite based heterogeneous catalysis.

21. Discuss the different methods for the fabrication of composite materials.

22. Derive equations for kinetic chain length and degree of polymerisation of free radical polymerisation. Explain the different ways in which chain transfer takes place in this polymerisation.

23. Write a detailed account on the principle and applications of electron microscopic and scanning probe microscopic techniques used in the characterization of nanomaterials.

(2 × 5 = 10 weightage)