**D4ACH2203** **(2 Pages)** **Name.....**
**Reg.No.....**

**FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2024**
**(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. Explain the term self-assembly with an example.
2. What are nano composites?
3. Give examples for nanocatalysts.
4. What are phase transfer catalysts? Give their applications.
5. Explain ionic polymerization.
6. What is gelation?
7. Give examples for polymers used as catalyst.
8. Explain solid state processing of composites.
9. How will you evaluate creep behavior in composites?
10. What is meant by atom transfer radical polymerization?
11. What are nano sensors? Give examples.
12. Give the importance of fracture mechanics in material science.

**(8 × 1 = 8 weightage)**

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

13. Explain different approaches in the synthesis of nano materials.
14. Discuss electronic structure theory of metals and semiconductors.
15. Explain the applications of heterogeneous catalysts in industrial synthetic processes.
16. Write a note on the use of catalyst in the removal of pollutants from exhausts.
17. Give the mechanism of ring opening polymerization.
18. Explain the copolymerization equation.
19. Discuss the micro structural features of fracture in metals.

**(4 × 3 = 12 weightage)**

**(P.T.O.)**

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

20. Explain the use of scanning probe microscopic techniques in characterization of nano materials.
21. Discuss the kinetics and mechanism of free radical polymerization.
22. Describe the different types of liquid crystalline polymers and their applications.
23. Give a detailed account on the techniques used in the preparation of ceramic matrix composite materials.

**(2 × 5 = 10 weightage)**