MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

Reg. No.										

DEPARTMENT OF SCIENCES, IV SEMESTER M. Sc. (CHEMISTRY)
END SEMESTER EXAMINATIONS, APRIL 2019

MATERIALS CHEMISTRY [CHM 5001]
(REVISED CREDIT SYSTEM-2017)

Time: 3 Hours | Date: 26-04-2019 | MAX. MARKS: 50

Note: (i) Answer **ALL** questions
(ii) Draw diagrams, and write equations wherever necessary

1. A. Write the molecular structures of calamitic liquid crystals with the same rigid core linking with various groups and the same terminal groups. Given that the rigid core is a Benzene ring, the terminal groups are: $-NO_2$, $-OC_8H_{17}$ and the linking groups are –COO- -CH=N-, -N=N-, -C≡C-.

1. B. List out the chemical and physical methods of preparation of nanomaterials. Explain any one of the physical method for the preparation of nanomaterials.

1. C. What are the advantages and disadvantages of tapping mode Atomic Force Microscope?

(4+4+2)

2. A. Discuss the chemical reactions of setting and hardening of cement.

2. B. Explain the various steps of Chemical Vapour Deposition for fabrication of thin films.

2. C. Differentiate between nematic and smectic liquid crystalline phases.

(4+4+2)

3. A. Explain the various non-ferrous alloys with their composition and applications.

3. B. Discuss the sensor applications of carbon nanomaterials.

3. C. What are the applications of discotic liquid crystals?

(4+4+2)

4. A. Compare the merits and demerits of thermal evaporation and sputtering processes of PVD techniques of thin films.

4. B. Discuss the various properties of nanomaterials.

4. C. (i) Give reason: H_2S is a gas at room temperature whereas H_2O is a liquid.
(ii) Explain the type of forces present in NaCl solution in water.

(4+4+2)

5. A. Explain the instrumentation of Transmission Electron Microscope with its working principle.

5. B. Discuss the different classes of ceramic materials with suitable examples.

5. C. What are the general characteristic properties of alloys?

(4+4+2)

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