Exam.Code1029
Sub. Code: 7544

2023

M. Tech. (Materials Science and Technology)

First Semester

MT-104: Synthesis of Materials

Time allowed: 3 Hours

Max. Marks: 50

***NOTE**: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Briefly explain:-

a) Sol-Gel method

b) DLVO theory

c) Electro-deposition

d) Single crystalline and polycrystalline materials

e) Thin films

(5x2)

UNIT - I

II. What is a size exclusion chromatography? Explain various methods for surface modification citing the examples of gold nanoparticles and carbon nanotubes. (10)

III. What are micro- and nano- porous' materials? What is biomimetics? Write a brief note on bio-mineralization. Explain with an example of mechano-chemical synthesis of nanomaterials. (10)

IV. What is membrane filtration? Give one example of how nanomaterials can be purified by selective solvent precipitation method. Explain the working principle of Langmuir-Blodgett films. Explain the advantages and disadvantages of the technique. (10)

UNIT - II

V. Explain with diagrams the working of RF and Plasma arch techniques. What is mechanical attrition? (10)

P.T.O.

VI. Briefly explain various lithographic techniques? Explain the working principle of UV- lithography. Briefly explain the use of electron beam lithography. (10)

VII. What is catalytic chemical vapour deposition? How it is different from metal organic chemical vapour deposition? Explain the working principle of a thermal evaporator. (10)

x-x-x