Paper Code: **CH-063**	**Roll No.**										

B. TECH.
SIXTH SEMESTER EXAMINATION, 2015-2016
FUNDAMENTALS OF NANOTECHNOLOGY

[Time: 2 Hours] **[Total Marks: 50]**

Note: Attempt ***ALL*** questions. Assume suitable data, if required.

1. Attempt any ***TWO*** parts of the following: - **[7x2]**

(a) Define the term 'Lubrication flow'. How will you Synthesize Nanoparticles at laboratory scale?

(b) Discuss the morphological changes during evolution of instability in thin liquid film. Calculate the approximate energy required to form a hole in an aqueous thin film, if the thickness of thin film is 8nm and the interfacial tension is γ= 18.8x 10-3 N/m.

(c) What is Critical Film Thickness? Enumerate the applications of Nanotechnology.

2. Attempt any ***TWO*** parts of the following: - **[6x2]**

(a) What Spreading Coefficient? Discuss the various types of soft materials.

(b) Define the term '*Fermi Surfaces'*. Also explain the working principle of Transmission Electron Microscope (TEM) with neat diagram.

(c) Describe the face centered cubic (FCC) structure of nanoparticles. Also discuss 'Pulsed laser method' for the synthesis of nanoparticles.

3. Attempt any ***TWO*** parts of the following:- **[6x2]**

(a) What are fullerenes? Explain the superconductivity nature of C_{60} with suitable sketch.

(b) How can you fabricate carbon nanotubes (CNT)? Explain the mechanical properties of CNT.

(c) What are the applications of carbon nano particles in Fuel cells and chemical sensors?

4. Attempt any ***TWO*** parts of the following:- **[6x2]**

(a) What do you mean by Ferromagnetism? Explain the dynamics of nanomagnets.

(b) Discuss different *Computational Techniques* with their applications and suitable examples.

(c) Describe applications of nano electromechanical systems (NEMS) with suitable figures.