Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

II SEMESTER M.TECH. END SEMESTER EXAMINATIONS APR 2018

SUBJECT: NANOSCIENCE AND TECHNOLOGY [CHE 5239]

REVISED CREDIT SYSTEM
(27/04/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.

1A.	Briefly describe the following nano-structures giving their applications: i) Nanowell ii) Nanorod iii) Nanodot iv) Nanobot v) Nanoshell	**(1.5x5) =7.5**
1B.	Briefly describe the incidence of nanostructures in plants/animals of the natural world which achieve functional effects using them. List and describe a few applications developed based on such biomemetics.	**2.5**
2A.	What is meant by quantum confinement? What is bandgap? Describe the effects of quantum confinement on bandgap.	**05**
2B.	Describe the working of AFM with a neat sketch. What are the differences in working principle and applications of SEM and AFM?	**05**
3A.	Describe the principle of XRD. Sketch typical crystalline and amorphous patterns. Give the Scherrer equation and describe how the crystallite size can be determined by using the equation.	**03**
3B.	Describe the use of nanotechnology in applications relating to energy.	**07**
4A.	Describe the synthesis of nanoparticles by sol-gel method and by laser ablation. Mention the advantages of each method.	**05**
4B.	Describe the applications of nanotechnology in environmental remediation.	**05**

5A.	Briefly describe the various methods of determining the nanoparticle size.	**05**
5B.	Describe the health, safety, and environmental concerns regarding nanomaterials. Base your answer on human implications, environmental implications and nanotoxicology.	**05**