Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

VII SEM B.TECH. (BME) DEGREE MAKE-UP EXAMINATIONS, DECEMBER 2017
SUBJECT: INTRODUCTION TO BIOMEDICAL NANOTECHNOLOGY (BME 4012)
(Revised Credit System)
Saturday, 30th December 2017: 2 PM to 5 PM

TIME: 3 HOURS **MAX. MARKS: 100**

Instructions to Candidates:

1. **Answer ALL questions.**
2. **Draw labeled diagram wherever necessary**

1.	(a)	Explain the effect of quantum confinement on the optical properties of semiconductor nanomaterials	10
	(b)	Explain surface plasmon resonance in metallic nanomaterials.	10
2.	(a)	Describe hydrothermal, sonochemical, and microemulsion routes for nanomaterial synthesis	10
	(b)	(i) Explain electron interaction with materials in scanning electron microscope (SEM). (ii) Explain the working principle if transmission electron microscope (TEM).	10
3.	(a)	Explain UV/Visible absorption spectroscopy and photoluminescence spectroscopy.	5
	(b)	Explain non radiative energy transfer mechanisms and resonance energy transfer mechanisms in the context of biosensors.	10
	(c)	Explain four design strategies for FRET based optical biosensors.	5
4.	(a)	Explain “pH induced” and “magnetic induced” nano drug delivery systems.	10
	(b)	Design a temperature induced intracellular drug delivery system for doxorubicin delivery, which can also deliver multi modal imaging nanoprobes (PET+CT imaging).	10
5.	(a)	What is tissue engineering? Explain electrospinning method used for tissue scaffold preparation.	10
	(b)	Explain photo thermal therapy, and design a nano system to induce targeted photo thermal therapy with doxorubicin delivery in the tumor tissue.	10