Name :
Reg No :

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

07 THRISSUR CLUSTER

Ph.D COURSEWORK EXAMINATION DECEMBER 2017

07CH7123 Nanomaterial and Nanotechnology

Time : 3 hours **Max. Marks: 60**

Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1a	Explain the significance of particle size in materials.	4
	Answer b or c	
b	Describe top down and bottom up approaches with suitable examples.	5
c	Explain defect structure and classification of defects in materials.	5

Q.no.	Module 2	Marks
2a	Explain the specific properties of nanomaterials.	4
	Answer b or c	
b	Explain the sol-gel method of nanoparticle synthesis. List its applications.	5
c	Describe the method of synthesis of TiO_2 nanoparticles.	5

Q.no.	Module 3	Marks
3a	Write down the important properties of Carbon nanotubes.	4
	Answer b or c	
b	Explain the principles of AFM. Evaluate it as a characterization technique for nanomaterials.	5
c	Compare and contrast TEM and XRD.	5

Q.no.	Module 4	Marks
4a	Explain the role of surfactants in the formation of polymer nanocomposites with suitable examples.	4
	Answer b or c	
b	Explain surface tension, surface energy and surface stress.	5
c	Describe the features of self-assembled ordered nanostructures.	5

Q.no.	Module 5	Marks
5a	What is the principle of nanoelectromechanical systems? Write down their applications.	5
	Answer b or c	
b	Describe various techniques of nanolithography.	7
c	Explain any four applications involving nanoelectronics.	7

Q.no.	Module 6	Marks
6a	Describe the term bionanotechnology.	5
	Answer b or c	
b	Explain the features of controlled drug delivery.	7
c	List any four applications of nanomaterials in medicines.	7