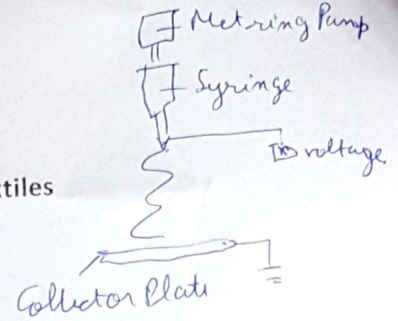

TTL 740 Science and Applications of Nanotechnology in Textiles

Major Exam

5th May 2017

8.00 to 10.00 A.M

Max Marks 40

Que 1. How is the principle of Electrospinning different as compared to conventional fiber spinning process? Draw the diagram of Electrospinning setup and describe the role of following parameters in controlling the morphology of nanofiber: (2+5)

a. Polymer molecular weight and concentration
b. Applied voltage
c. Flow rate
d. Distance between capillary tip and collector
e. Temperature & Humidity

Que 2. What is the mechanism by which silica and titania nanoparticles work when used in nanofinishing to get self-cleaning effect on textiles? Explain the difference between the two mechanisms. (5)

Que 3. Write a short note on the topic given to you for assignment presentation. (3)

Que 4. Which characterization technique/s would be most suitable to investigate the following? Briefly explain –why and how? (15)

a. Extent of exfoliation –intercalation of clay in polymer nanocomposite
b. Surface topography and roughness in nanocoated polymer film
c. Particle size and size distribution & Stability of nanosol of silver nanoparticles
d. Quality and type of carbon nanotube (CNT)
e. Elemental composition and uniformity in metal nanoparticle coating

Que 5. What is the difference in property/functionality obtained when following gases are purged in a plasma reactor with a PET fabric sample exposed? Explain the mechanism & give reasons. (6)

a. Argon
b. Oxygen
c. Nitrogen
d. Fluorocarbon

Que 6. What is POSS? In how many ways it can be incorporated in polymer? What properties are expected to improve when it is reinforced in a HDPE polymer? (4)