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(b) Explain one Bottom-up approach of nanomaterials synthesis.

(c) Illustrate properties of Nylon-6/clay nanocomposite.
(3×5)

(100)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5558 J

Unique Paper Code : 6092013602

Name of the Paper : Polymeric Nanomaterials and Nanocomposites

Name of the Course : **B.Sc. (H) Polymer Science-UGCF**

Semester : VI

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **six** questions in all.
3. Draw neat and labelled diagram wherever necessary
4. Each question carries **15** marks.

1. (a) What are Nanomaterials? Describe the structure of 1D, 2D and 3D nano-reinforcing agents with suitable examples.

P.T.O.

- (b) What is nano clay? Explain the experimental procedure for the preparation of nano clay.
- (c) Describe the properties of montmorillonite clay.
(3×5)
2. (a) What is POSS? How POSS can be incorporated into a polymer matrix. Explain the properties of POSS.
- (b) Explain the morphology of polymer- Layered silicate nanocomposites. (10+5)
3. (a) What are nanotubes? Discuss SWCNTs and MWCNTs in details.
- (b) What is percolation theory? Why it is important in nanocomposite.
- (c) Discuss the factors affects the percolation threshold. (3×5)
4. (a) Explain the characterization of nanocomposite by X-ray diffraction.

- (b) Describe the effect of size, shape and diameter of nanoparticles (nanotubes) in nanocomposites.
(5+10)
5. (a) What is Lennard-Jones Potential? Discuss the bonding potential and also explain its advantage with suitable examples.
- (b) Explain the effect of chain architecture in nanocomposites. (10+5)
6. (a) Discuss the formation of polymer nanocomposite with suitable schematic representation.
- (b) Discuss the future scope of nanomaterials in India.
- (c) Explain any two interactions in polymer nanocomposites. (3×5)
7. (a) Discuss the morphology of crystalline polymers.