Reg. No.: \_\_\_\_\_\_\_\_

**Karunya University**

**(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)**

**END SEMESTER EXAMINATION – NOV/ DEC 2016**

**Subject Title: MOLECULAR AND MATERIALS SELF–ASSEMBLY Time: 3 hours**

**Subject Code: 12CH319 Maximum Marks: 100**

**Answer all the questions (5 × 20 = 100)**

1. **Compulsory :**

a. Briefly explain the role of hierarchy in self-assembly, citing out examples in nature.

b. What are the driving forces behind molecular and materials self-assembly?

c. Give a detailed account of self-assembled monolayers with suitable illustration. Mention the methods of analyzing them. (5+5+10)

2. a. Discuss the method of assembling metallopolymers in LbL form. (5+5+10)

b. What are electrostatic superlattices?

c. Give a brief account of crystal engineering of oriented zeolite films.

(OR)

3. Give a detailed account of (a) organic polyelectrolyte multilayers (b) non-electrostatic LbL assembly. (10+10)

4. Discuss modulated diameter gold nanorods (b) Describe nanorod end-to-end self-assembly using DNA, with an illustration. (10+10)

(OR)

5. a. Illustrate and explain the manipulation of nanorods

b. Explain in detail a case of hierarchical ordering of nanorods. (10+10)

6. Discuss the following: (10+10)

a. Nanocluster semiconductor alloys.

b. Electrons and holes in nanocluster boxes.

(OR)

7. Illustrate and explain

a. capped gold nanoclusters.

b. nanocluster phase transformations.

c. silver nanocluster superlattice. (10+5+5)

8. Illustrate and explain making (a) nanostructured ceramics (b) block copolymer thin films.

(OR)

9. Discuss elaborately block co-polypeptide self assembly.