

Roll No.

Total Pages : 3

239404

May, 2019

M.Sc. IV SEMESTER

Inorganic Chemistry Special IV (CH-404A)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

- 1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
- 2. Answer any four questions from Part-B in detail.*
- 3. Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) List different type of receptors in supramolecular interactions. (1.5)
(b) What do you mean by self-assembly? (1.5)
(c) Give two reactions of Ag nanoparticles. (1.5)
(d) Why nanoparticles differ in properties with the same material in bulk? (1.5)
(e) Differentiate between top-down and bottom-up approach. (1.5)
(f) Give two important reactions of BrF_3 in non-aqueous solvent. (1.5)

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- (g) Write two fields of applications of supramolecular chemistry. (1.5)
- (h) Differentiate between rutile and antirutile compounds. (1.5)
- (i) What are argillaceous materials? (1.5)
- (j) What is false set? (1.5)

PART-B

2. (a) What are coreceptor molecules? Explain how a coreceptor molecule can bind cationic and anionic substrate simultaneously? (8)
- (b) What do you understand by supramolecular devices? Briefly explain supramolecular ionic devices with the help of a suitable example. (7)
3. (a) Write a short note on optical properties of nanostructured materials. (5)
- (b) Describe the following techniques briefly for synthesis of nanoparticles with a suitable diagram :
- (i) Sputtering
- (ii) Microwave plasma based CVD. (5×2)
4. (a) Draw and explain structure of following compounds :
- (i) Mn_2O_3
- (ii) Calcite. (5×2)
- (b) Explain self-ionization and other important reactions taking place in H_2SO_4 solvent. (5)

5. (a) Write a note on Bogue calculation. (5)
- (b) Discuss moduli values and their effects. (5)
- (c) Describe hydration of cement with hydration reactions. (5)
6. (a) Discuss the role of clinker phase on properties of cement. (5)
- (b) List the physical and chemical tests carried out to test cement. Explain the procedure for testing insoluble residue of cement. (5)
- (c) Write a short note on anion binding receptors in supramolecular interactions. (5)
7. (a) Briefly explain band theory in solids and its implications. (8)
- (b) Discuss in detail sol gel method of synthesis of nanoparticles. (7)