S.No: 6243 P 22 CHE 1 B

(For candidates admitted from 2022 - 2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Chemistry - Elective

SUPRAMOLECULAR CHEMISTRY

Time: Three hours **Maximum:** 75 marks

SECTION - A (20 Marks)

Answer **ALL** questions.

I. a. Multiple Choise Questions: (5 x 1 = 5)

1. What is the following option containing only non-covalent interactions?

   (a) Disulfide bond, ionic bond (b) Ionic bond, peptide bond

   (c) Hydrogen bond, disulfide bond (d) Hydrogen bond, ionic bond

2. Which among the following is an example of an organometallic system?

   (a) Zeolite (b) Anthracene

   (c) Anglesite (d) Bauxite

3. What is another name for co-receptors in supramolecular chemistry?

   (a) Cationic receptors (b) Single-unit receptors

   (c) Cell surface receptors (d) All

4. Select the incorrect statement from the following options.

   (a) In the micelle formation, the water-soluble heads are directed toward the center

   (b) In the micelle formation, the water-soluble heads are on the surface in contact with the water

   (c) In the micelle formation, the water-insoluble tails are directed toward the center

   (d) None of the mentioned

5. Second-sphere co-ordination compounds belong to

   (a) Intra-molecular photochemistry (b) Intermolecular photochemistry

   (c) Supramolecular photochemistry (d) Supermolecular photochemistry

b. Fill in the blanks (5 x 1 = 5)

6. ..... interaction is very strong

7. The class of MOFs to form a structure ----------.

8. In water, non-polar molecules tend to aggregate because they are forced to come into close proximity with each other due to _____

9. Due to their ..... dendrimers are used in nanomedicine research

10. Tubular Mesophases is the one type of .....devices.

II. Answer the following question: (5 x 2 = 10)

11. Write the various types of molecular recognition.
12. What is meant by nanoporous solid MOFs?
13. Write the term large molecular cages.
14. How do you define supramolecular metallocatalysis?
15. Define the switchable molecular wire.

SECTION – B (5 x 5 = 25 marks)

Answer ALL Questions, Choosing either (a) or (b)

16. (a) what are the concepts involved in synthons-based non-covalent interactions? **(Or)**

    (b) Explain the following terms (i) polymorphism and (ii) supramolecular isomorphism.

17. (a) Write notes on the interligand hydrogen bond metal complexes. **(Or)**

    (b) Define MOFs. Explain the Molecular rods and ladders of organometallic systems.

18. (a) Mention the dinuclear and polynuclear metal ion cryptates. **(Or)**

    (b) Define the multiple recognition in metallareceptors.

19. (a) what are supramolecular metallocatlysis? Give some examples. **(Or)**

    (b) Explain short notes on biomolecular and abiotic catalysis.

20. (a) What is meant by supramolecular photonic devices? Explain shortly. **(Or)**

    (b) Write detailed notes on the tubular mesophases and molecular photonics.

SECTION – C (3 x 10 = 30 marks)

Answer any **THREE** out of 5 questions.

21. Explain the below concepts

    (a) Hydrogen bonds

    (b) C-H..X interactions

    (c) π-π interactions

    (d) non-bonded interactions

22. Write notes on the crystal engineering of NLO and OLED materials.
23. Define and explain the cyclophone and amphiphilic receptors.
24. Write short notes on the following terms.

    (a) Macrocyliccation receptor molecules

    (b) Reactive anion receptor molecules

25. Write detailed notes on the supramolecular chemistry used in the nanomedicine industry.

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