

TB206205W

Reg. No :

Name :

B. Sc. DEGREE (C.B.C.S.) EXAMINATION, MARCH 2023
(2020 Admission Regular, 2019, 2018 Admissions Supplementary)
SEMESTER VI - CHOICE BASED CORE (CHEMISTRY)
CH6B13AB18 - NANOCHEMISTRY AND NANOTECHNOLOGY

Time : 3 Hours

Maximum Marks : 80

Part A

I. Answer any Ten questions. Each question carries 2 marks

(10x2=20)

1. Identify four types of artificial nanomaterials.
2. Cite different types of carbon nanotubes.
3. Define self assembly.
4. Identify a method to determine the size of nanoparticles.
5. Is fullerene a good conductor of electricity? If so, why?
6. Cite any substance which can be used for chemical fixation in TEM.
7. Cite any two applications of SIMS.
8. Discuss the term cryofixation with respect to TEM.
9. Indicate the reason for the change in the colour of different sized quantum dots.
10. "Metals become semiconductors as their size is decreased". Illustrate.
11. Define MOF.
12. Define sensors.

Part B

II. Answer any Six questions. Each question carries 5 marks

(6x5=30)

13. Identify the use of gold as the preferred surface during the preparation of SAMs. Justify the importance of cleanliness of gold surface.
14. Discuss the growth mechanism of CNT on a metal based catalyst and non-metal based catalyst.
15. Classify nanomaterials based on origin and structural configuration. Illustrate with examples.
16. Discuss the advantages and disadvantages of AFM.
17. Write a note on the principle of Scanning Probe Electron Microscopy.
18. Summarize quantum confinement and its effect on the electrical properties of nanomaterials.
19. Explain Coulomb blockade.
20. Discuss the role of nanoparticles in catalysis.
21. Outline how nanoparticles can be used in drug delivery.

Part C

III. Answer any Two questions. Each question carries 15 marks

(2x15=30)

22. Outline important properties and applications of (c) C₆₀Fullerenes (d) Carbon nanotubes
23. Discuss the principle of Scanning Electron Microscopy. Write a note on different types of SEMs. List its advantages and disadvantages.

24. a) Discuss the principle of ETEM. Enumerate its features. b) Discuss the advantages and disadvantages of Scanning Electron Microscopy.
25. Explain the relevant techniques of organising nanoparticles on substrates in nanosensors.