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Reg. No. :

Code No. : 10498 E

Sub. Code : CECH 62

B.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2024.

Sixth Semester

Chemistry

Major Elective — NANO CHEMISTRY

(For those who joined in July 2021–2022)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions..

Choose the correct answer.

1. Who coined the term nano technology?
 - (a) Norio taniguchi
 - (b) Seigal
 - (c) Alex Zetti
 - (d) Sumio Iijima

1 nm equal to

- (a) 10^{-9} cm
- (b) 10^{-9} m
- (c) 10^{-10} cm
- (d) 10^{-10} m

The nano material used as semiconductor

- (a) Ag
- (b) Cds
- (c) Mgo
- (d) Au

The plant extract is used as _____ in the biosynthesis of nano particles.

- (a) catalyst
- (b) reducing agent
- (c) oxidising agent
- (d) capping agent

In TEM the image is given by

- (a) incident ray
- (b) reflected ray
- (c) transmitted ray
- (d) gamma ray

For semi conductors the band gap energy is

- (a) < 1.7 ev
- (b) > 3.0 ev
- (c) 1.7 to 30. ev
- (d) 1.2 to 3.3 ev

7. The cathode used in lithium ion battery is
(a) LiCoO_2 (b) LiC
(c) SiO_2 (d) A/N
8. Fuel cell used in Apollo spacecraft is
(a) H_2 fuel cell (b) Li cell
(c) Li ion cell (d) O_2 fuel cell
9. CNT is stronger than _____ times the same mass of steel.
(a) 10 (b) 25
(c) 50 (d) 100
10. In montmorillonite clay the ratio of silica and alumina is
(a) 1:1 (b) 1:2
(c) 2:3 (d) 2:1

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain any two properties of nano-composites.

Or

- (b) Write about nano wires and quantum wells.

12. (a) Explain the two main approaches used in the synthesis of nano materials.

Or

- (b) Explain the sol-gel method of synthesis of nano particles.

13. (a) What is the principle of SEM? Using this how can you determine the surface topography of a nanosample.

Or

- (b) Explain the principle and working of TEM.

14. (a) Write short notes on nano drug delivery system with examples.

Or

- (b) What are the applications of nano particles in medicine?

15. (a) What are Fullerenes? How are they prepared?

Or

- (b) Explain the preparation and applications of graphene.

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain the background of nano science and discuss Feynmann's vision.

Or

- (b) Define the following :

- (i) Nano chemistry
- (ii) Quantum effects
- (iii) Surface/volume ratio

17. (a) Write short notes on :

- (i) Sonolysis
- (ii) CVD method

Or

- (b) Describe any two physical methods of synthesis of nano particles.

18. (a) Explain the principle, working and applications of XPES.

Or

- (b) Write the types and applications of AFM.

19. (a) What are the applications of nano composites in lubricants?

Or

- (b) How are nano composites applied to aerospace industry?

20. (a) Explain in detail about the types of CNT.

Or

- (b) Describe the applications of CNT.
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