

(6 pages)

Reg. No. :

Code No. : 5404

Sub. Code : ZPHE 43

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023

Fourth Semester

Physics

Elective--NANOPHYSICS

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Solgel method is an example for _____ approach.
- (a) top-down
 - (b) bottom-up
 - (c) both (a) and (b)
 - (d) none

2. Quantum dots are _____ nanomaterial

- (a) zero-dimensional
- (b) one-dimensional
- (c) two-dimensional
- (d) three-dimensional

3. Modulus of Resilience

- (a) Yield stress/Youngs Modulus
- (b) (Yield stress)²/Youngs Modulus
- (c) (Yield stress)²/2 Youngs Modulus
- (d) Yield stress *Youngs Modulus

4. Plasticity is _____

- (a) permanent deformation
- (b) temporary deformation
- (c) reversible
- (d) elasticity

5. The secondary electrons radiated back in SEM are collected by

- (a) specimen
- (b) anode
- (c) vacuum chamber
- (d) cathode

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6. X-rays are
- (a) deflected by an electric field but not by the magnetic field
 - (b) deflected by a magnetic field but not by an electric field
 - (c) deflected by both a magnetic field and an electric field
 - (d) not deflected by an electric field and a magnetic field
7. The nanostructures are categorized into _____ types according to their dimension.
- (a) one (b) two
 - (c) three (d) four
8. Who first produced nanostructured materials?
- (a) Gerd Binning (b) Alex Zettl
 - (c) P.M. Ajayan (d) H.Gleiter
9. Which one of the following is an example of zero-dimension nanostructure?
- (a) Nanoparticles
 - (b) Nanorod
 - (c) Nanolayers
 - (d) all the above

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10. Where does graphene oxide used?

- (a) cellular imaging
- (b) drug delivery
- (c) cancer treatment
- (d) all the above

PART B — (5 × 5 = 25 marks)

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

11. (a) Explain the structure of nanotube and their types?

Or

- (b) Write a short note on CNT?

12. (a) What are Nanocomposites. Explain?

Or

- (b) Explain compressive strength?

13. (a) Explain the Debye-Scherer formula?

Or

- (b) What are X-rays? Explain X-ray diffraction?

14. (a) Explain the Arrhenius relation?

Or

- (b) What are the properties of Nanostructured materials?

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[P.T.O.]



15. (a) Explain photonics?

Or

- (b) Define Solar cells?

PART C — (5 × 8 = 40 marks)

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

16. (a) Define Quantum nanostructure and its classification.

Or

- (b) Compare the Bottom-up approach and the Top-down approach. Give the advantages and disadvantages of both.

17. (a) Explain the mechanical properties of Nanocomposites?

Or

- (b) Explain the synthesis of nanocomposites by Sputtering?

18. (a) Explain the instrumentation of the scanning electron microscope?

Or

- (b) Explain the differential scanning calorimetry?

19. (a) Explain the optical properties of Nanostructured materials?

Or

- (b) Explain deformation in detail?

20. (a) Explain the application of Nanostructured materials in biotechnology.

Or

- (b) What are Nanostructured materials? Give its applications?
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