B.Sc. DEGREE EXAMINATION NOVEMBER 2019
BRANCH III - PHYSICS
FIFTH SEMESTER

COURSE   :   MAJOR – ELECTIVE
PAPER   :   ESSENTIALS OF NANOSCIENCE
TIME   :   3 HOURS   MAX. MARKS : 100

SECTION - A
ANSWER ALL QUESTIONS: (10x3=30)

1. What is the difference between nanoscience and nanotechnology?
2. Name few properties which are affected when there is transition from bulk to nanoscale also define bohr exciton.
3. Give examples for 1-D, 2-D and 3-D nanoparticles.
4. What are quantum dots?
5. Explain ball milling method and its disadvantage.
6. What is chemical vapour deposition.
7. State the limitations of SEM.
8. List the information that can be obtained from powder XRD.
9. Explain how quantum dots are used to detect cancer.
10. Give few examples for nanosensors.

SECTION – B
ANSWER ANY FIVE QUESTIONS: (5x5=25)

11. Explain Quantum confinement.
12. Give a detail account of magnetic nano particles.
13. Explain any two physical approaches for the synthesis of nano particles.
14. Write a note on photoluminescence.
15. List few uses of nanomaterials in medicine.
16. Define bucky ball .What are the methods for producing bucky ball?
17. Explain sol gel synthesis for producing nano materials.

SECTION – C
ANSWER ANY THREE QUESTIONS: (3x15=45)

18. (i) What are the milestones in the evolution of nanotechnology? What are the challenges faced by researchers in nanotechnology.
    (ii) Why surface to volume ratio is very large for nano particles compared to bulk materials? Explain with a simple example

19. (i) Explain metal oxide nano particles and highlight their uses.
    (ii) Define carbon nanotube. List methods of producing carbon nanotubes.

20. Explain the preparation of nano materials by sputtering deposition and ion beam technique.

21. Explain powder x-ray diffraction and discuss how particle size can be estimated using diffraction peaks.

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