

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – PHYSICS

FOURTH SEMESTER – APRIL 2022

16/17/18UPH4ES03 – INTRODUCTORY NANO SCIENCE AND NANO TECHNOLOGY

Date: 23-06-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A

Q. No Answer ALL Questions (10 x 2 = 20 Marks)

- 1 Define nanotechnology.
- 2 Write down the classification of nano particles.
- 3 What are surface area and aspect ratio of nano particles?
- 4 Write the Hall-Petch equation to find the hardness of nanomaterials.
- 5 Give any two advantages of Molecular Beam Epitaxy method.
- 6 What is Band gap energy?
- 7 Write the principle of X-Ray diffractometer.
- 8 Mention the main components of a UV spectrophotometer.
- 9 What are surfactants? Give examples.
- 10 Give any two advantages of nano materials in medical devices?

PART – B

Answer any **FOUR** Questions (4 x 7.5 = 30 Marks)

- 11 Discuss in detail, the electrical and optical properties of nanoparticles.
- 12 Explain in detail, the classification of nano materials based on their dimensions
- 13 Write a brief note on the dielectric properties of nanomaterials.
- 14 Explain in detail, the hydrothermal method of preparing nano particles.
- 15 With a neat diagram, explain the working of Scanning electron microscopy.
- 16 With a neat diagram, explain the chemical vapor deposition (CVD) method of synthesizing nanoparticles.

PART – C

Answer any **FOUR** Questions (4 x 12.5 = 50 Marks)

- 17 Explain the synthesis of nanoparticles by Molecular Beam Epitaxy method.
- 18 Describe the classification of nanomaterial based on their structure with its energy equation.
- 19 Explain the principle and working of X-ray diffractometer with necessary diagrams
- 20 Explain in detail how nanomaterial plays a vital role in molecular communication and networks.
- 21 Explain the Sol-Gel method of synthesizing nanomaterials.
- 22 Explain the significance of nano robots in medicine and in energy storage devices.

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