

A-0598

Total Pages : 3

Roll No.

MSCPH-552

M.Sc. PHYSICS (MSCPH)

(Material Science)

4th Semester Examination, Session December 2024

Time : 2:00 Hrs.

Max. Marks : 70

Note :- This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.***

Section-A

Long Answer Type Questions **2×19=38**

Note :- Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.

1. Explain the principle of X-ray diffraction and discuss its significance in structural analysis.
2. Describe the process of doping in semiconductors. What is the purpose of doping, and how does it affect the electrical properties of the semiconductor ?
3. What are the various methods for fabricating thin films, and how does the gas phase fabrication method work ?
4. Differentiate between biomaterials-, advanced materials, and smart materials. Which of these materials is preferred in modern applications, and why ?
5. What are nanomaterial, and why are they important ? Discuss the top-down and bottom-up approaches for synthesizing nanomaterial, providing examples of techniques used in each approach.

Section–B

Short Answer Type Questions 4×8=32

Note :– Section ‘B’ contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Explain the Raman spectroscopy. What information does we get from it ?

2. What are Quantum dots ? How does the size of a quantum dot affect its emission wavelength ?
3. What is the difference between thermal chemical vapour deposition (CVD) and plasma-enhanced CVD ?
4. What are polymers, and what are their physical properties ?
5. Define the process of quenching in heat treatment, and how does it affect the properties of metals ?
6. What is the working principle of a Transmission Electron Microscope (TEM) ?
7. What is the principle of NMR spectroscopy ? What type of nuclei are studied in NMR spectroscopy ?
8. What are single crystals ? What are the applications of single crystals in modern technology ?
