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NEPWT—230—2024

FACULTY OF SCIENCE

M.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(NEP-2020)

PHYSICS

Paper—SPHYE-501C

(Nanophysics)

(Tuesday, 17-12-2024)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—60

N.B. :— (i) All questions carry equal marks.

(ii) Question No. 1 is compulsory.

(iii) Solve any three of the remaining five questions (Q. No. 2 to Q. No. 6).

(iv) Figures to the right indicate full marks.

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| 1. | (a) | What is nanomaterial and nanotechnology ? | 5 |
| | (b) | Explain the magnetic properties of nanomaterial. | 5 |
| | (c) | Discuss the principle and applications of Sol-Gel Method. | 5 |
| 2. | (a) | Explain one-dimensional and 2-dimensional nanostructure. | 8 |
| | (b) | Discuss microporous and mesoporous materials in detail. | 7 |

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3. (a) Explain the magnetic properties of nanomaterials. 8
- (b) What is surface plasmon resonance in metal nanoparticles ? Explain in detail. 7
4. (a) Discuss chemical bath deposition, including its mechanism and synthesis method. 8
- (b) What is spray pyrolysis techniques ? Describe the deposition mechanisms involved in it. 7
5. (a) What are the principles of AFM ? Explain its working mechanism. 8
- (b) What is the use of Fourier Transformed Infrared Spectroscopy (FTIR) and how does it work ? 7
6. (a) Write a short note on core shell structure. 5
- (b) What is thin film ? Explain the use of thermal evaporation method ? 5
- (c) What are the properties of X-ray diffraction ? 5