November 2025
M.Sc.
Third Semester
DISCIPLINE SPECIFIC ELECTIVE – 01
PHYSICS
Course Code: MPHD 3.11 (A)
(Nanoscience)

Total Mark: 70 *Pass Mark: 28*
Time: 3 hours

Answer five *questions, taking* one *from each unit.*

UNIT–I

1. What is the surface to volume ratio in nanomaterials? Explain fullerenes and carbon nanotubes. 2+12=14

2. Explain quantum confinement in nanostructures. Write detailed accounts of biological nanomaterials. 4+10=14

UNIT–II

3. Discuss the various properties of nanomaterials. 14

4. Give an account of electron confinement and quantum size effects. 14

UNIT–III

5. Explain the synthesis of nanomaterials by sol-gel techniques with a neat diagram. 14

6. With the help of diagram, describe the lithography for synthesis of nanomaterials. 14

UNIT–IV

7. Explain the UV-visible spectroscopy for characterisation of nanomaterials. 14

8. Discuss the scanning electron microscope for characterisation of nanomaterials, with a neat diagram. 14

UNIT–V

9. Write a note on each of the following: 7×2=14
   (a) Nanomedicine and its use in drug delivery system
   (b) Superparamagnetic nanoparticles and cancer therapy

10. Discuss in detail about biosensors. 14