

M.Sc.(Physics) (CBCS Pattern) Semester - III
**PSCPHYT12-2 - Foundation Course F1.2-Paper-XII : Fundamentals of
Nanoscience and Nanotechnology**

P. Pages : 1

Time : Three Hours



GUG/S/23/11303

Max. Marks : 80

Either:

1. a) Explain Quantum confinement, quantum well and quantum dots. **8**
b) Derive and explain in detail Schrodinger equation for a particle in a box. **8**

OR

- e) Explain density of state for zero, one and two dimensional materials. **8**
f) Explain working and characteristics of field effect transistor. **8**

Either:

2. a) Explain in detail fabrication of carbon nanotube. **8**
b) Explain electrical and mechanical properties of carbon nanomaterials. **8**

OR

- e) Explain in detail optical properties of nanomaterial. **8**
f) Explain thermal and magnetic properties of nanomaterials in detail. **8**

Either:

3. a) Explain bottom up ball milling process in the synthesis of nanomaterials. **8**
b) Explain hydrothermal combustion method for the synthesis of nanomaterials. **8**

OR

- e) Explain sol-gel method for the synthesis of nanomaterials. **8**
f) Explain chemical vapour deposition process for the synthesis of nanomaterials. **8**

Either:

4. a) Explain in detail working of biosensor. **8**
b) Discuss DNA double nanowire in detail. **8**

OR

- e) Explain Bionanostructure of- **8**
i) Micelles and
ii) Vesicles
f) Discuss the biological building block in bionanotechnology. **8**

5. Attempt **all** of the following.
a) Explain Heisenberg uncertainty principle. **4**
b) Discuss structure of carbon nanotube. **4**
c) Explain wet chemical method for synthesis of nanomaterials. **4**
d) Explain multilayer films in bionanostructure. **4**
