

Registration Number:

Date & session:



ST. JOSEPH'S UNIVERSITY, BENGALURU -27
Physics Open Elective– IV SEMESTER
SEMESTER EXAMINATION: APRIL 2023
(Examination conducted in May 2023)
PHOE06: Introductory Nanotechnology
(For current batch students only)

Time: 2 Hours

Max Marks: 60

This paper contains 2 printed pages and 3 parts

PART-A

Answer any SIX questions. Each question carries SIX marks

6×6=36

1. Discuss the density of states of 1D, 2D and 3D nanomaterials.
2. Write a brief note on quantum cryptography with neat diagrams.
3. With a neat diagram, discuss plasma based sputtering technique.
4. With a neat diagram, discuss projection based lithographic technique.
5. Classify carbon nanotubes based on the chirality.
6. Discuss the magnetic vortices in detail with a neat sketch.
7. Explain the nano indentation process in detail.
8. Will spintronics overcome our conventional electronics? Share your ideas and thoughts.

PART-B

Answer any EIGHT questions. Each sketch carries TWO marks

8×2=16

9. Sketch the following and label the parts.
 - (i) Coupled Quantum Wells
 - (ii) Excitons
 - (iii) Diodes
 - (iv) Emission lines
 - (v) Scattering transport
 - (vi) Ballistic transport
 - (vii) Ostwald ripening

PHOE06_A_23

- (viii) Light waves
- (ix) Stark effect
- (x) Tunneling

PART-C

Answer any EIGHT the following questions. Each sketch carries ONE mark

8×1=8

10. Write down the following abbreviations used in nanotechnology.

- (i) CVD
- (ii) MBE
- (iii) QD
- (iv) QWW
- (v) RF
- (vi) MTJ
- (vii) SET
- (viii) GMR
- (ix) QHE
- (x) MEMS