

City College

Internal Examination 2021

Physics (Hons) 6th Semester

Paper: DSE-A2(a) (Nano Materials & Applications)

Time- 1 hour

Full Marks-20

Answer any ten questions.

10×2=20

1. Compare the surface to volume ratio of spherical nanoparticles of diameter 100nm and 10nm.
2. Draw the density of states versus energy diagram for 0D and 1D nanostructures.
3. What is the use of photoresist in photolithographic process?
4. What are the advantages of electron beam evaporation over other thermal evaporation techniques?
5. Write the applications of electro-deposition method for synthesis of nanoparticles.
6. What is the use of Goniometer and Collimator in X ray diffractometer?
7. Why electron microscopes provide better images than optical microscopes?
8. What are the secondary electrons and why they are useful in Scanning electron microscopes?
9. What is the basic working principle of atomic force microscopy?
10. Why the term 'tunneling' is used in Scanning tunneling Microscope?
11. What is quantum dot? Write few applications of quantum dots.
12. What is Coulomb blockade effect?
13. What is quasi particle? How is it different from real particles?
14. In case of variable range hopping conduction, how conductivity depends on temperature?
15. Distinguish between optical and electrical band gap.

-----End of Question Paper-----

E-mail the scanned copy of answer script to sem6hcityphysics@gmail.com within **15 minutes** after the end of the examination.