

Minor Test

Marks 20

Each question carry 2 marks.

1. Plot the allowed values of k for 3D, 2D and 1D electron gases.
2. From these curves obtain the density of states expression and plot density of state curves.
3. What is direct and indirect band gap semiconductors? Explain by drawing E-K curves
4. Explain the observation of efficient light emission observed in porous silicon in terms of E-k relationship.
5. Explain multiple domain, single domain and super-paramagnetic phase in a magnetic nanoparticle.
6. Draw and explain the M-H curves and name 1 application each for these cases.
7. Find the critical dimension below which a nanorod sample will acquire single domain configuration.
8. What is blocking temperature? How can it be determined experimentally?
9. What is crystalline anisotropy and shape anisotropy in case of magnetic nanorod sample?
10. Explain the functioning of scanning tunnelling spectroscopy technique for a metal surface.
What information can be obtained from the results?

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