

Tutorial 1

1. Why superconductivity is the low temperature phenomenon?
2. Plot the variation of resistance versus temp in case of pure metal?
3. What do you mean by critical magnetic field?
4. What is the persistence current?
5. Why superconductors are perfectly diamagnetic in nature?
6. State and explain (1) critical field (2) Meissner effect
7. Explain the BCS theory of superconductors?
8. Discuss the application of superconductors?
9. What is the Josephson Effect? Write two applications for the same.
10. State and explain Meissner effect. Hence show that susceptibility is negative in superconducting state?
11. Explain: effect of external magnetic field on superconductors?
12. Explain Josephson Effect. What is Josephson junction? Draw its neat labeled diagram. State any one application of the Josephson Effect.
13. Write four applications of superconductivity?
14. What do you mean by "Cooper pairs"?
15. The critical field for vanadium is 10^5 Am^{-1} at 8.58 K and $2 \times 10^5 \text{ Am}^{-1}$ at 0 K. Determine the T_c value.
16. A superconducting material has a critical temp of 4.0° K at zero magnetic fields and a critical magnetic field at 0.2 Tesla at 0° K . Find the critical magnetic field at 2° K .