

## Superconductivity

(Pg 1)

### Important Questions

- Q1 Explain Meissner effect. Prove that Meissner effect and state of resistivity are mutually independent of each other.
- Q2 What is Josephson effect? Describe DC and AC Josephson effect?
- Q3 Write a short note on BCS theory of superconductivity?
- Q4 Prove that magnetic flux within the superconducting ring is quantised in units of  $h/2e$  (flux quantization)?
- Q5 (a) What are high- $T_c$  superconductors? Give some examples  
(b) explain the isotope effect, in superconductivity  
(c) explain the difference between type I & type II superconductors
- Q6 (a) Define superconductivity? what is the significance of critical temperature, critical magnetic field and critical current density for superconductors  
(b) Discuss the important applications of superconductivity?
- Q7 The critical temperature for a metal with isotopic mass 199.5 is 4.188K. Calculate its critical temperature above its isotopic mass change to 203.4.
- Q8 The London's penetration depth for a superconductor at 3K and 7.1K are 39.6 nm and 173nm respectively.

## Determine The Superconducting Transition Temperature

Q9 Explain London theory in context of superconductivity. What is London's Penetration depth?

Q10 The London Penetration depth for lead at 3K and 7K are respectively 396 Å and 1730 Å. Calculate the Penetration depth at 0K: