E 6384 (Pages : 2) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2019

Sixth Semester

Core Course—CONDENSED MATTER PHYSICS

(Common for B.Sc. Physics Model I, Physics Model II, Physics EEM and Physics Instrumentation)

[2013 Admission onwards]

Time : Three Hours Maximum Marks : 60

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. The solid composed of atoms or other microscopic particles arranged in an orderly repetitive array is called ————.
2. The number of possible space lattices is ————.
3. The nature of bonding in sodium chloride is ————.
4. The dielectric strength of PVC is ————.
5. The electrical resistance of a super conductor is ————.
6. The example for soft super conductor is ————.
7. The longest nano tubes can have length of the order of ————.
8. A superconducting material behaves like a perfect ———— material.

(8 × 1 = 8)

Part B

Answer any **six** *questions.*
Each question carries 2 *marks.*

9. How does a crystal differ from lattices ?
10. What is fcc structure ?
11. What is Bragg's law ? Explain.
12. Explain spin waves.
13. What is anti-ferromagnetism ?

Turn over

14. State the physical significance of Clausius - Mosotti relation.
15. What is nano structure ?
16. What is Meissner effect ?
17. What is SQUID ?
18. Explain the term "Band Gap Energy".

(6 × 2 = 12)

Part C

Answer any **four** *questions.*
Each question carries 4 *marks.*

19. Obtain Miller indices for planes (3a, 3b, 3c).
20. Calculate the wavelength of the x-rays incident at 15° with the plane of the first order reflection from a calcite crystal with inter atomic spacing 3.5A°.
21. What is paramagnetism ? Obtain Langevin's formula for paramagnetic susceptibility.
22. A superconductivity material has a critical temperature of 3.7K in zero magnetic fields and a critical field of 0.0306 Tesla at 0K. Find the critical field at 2K.
23. What is London Equation in superconductivity ? Explain.
24. Give an account on liquid crystals.

(4 × 4 = 16)

Part D

Answer any **two** *questions.*
Each question carries 12 *marks.*

25. Explain briefly the Powder Method for crystal structure analysis.
26. Explain the two dimensional and three dimensional lattice types.
27. Explain the domain theory for ferromagnetism.
28. Explain in detail about Type I and Type II superconductors.

(2 × 12 = 24)