

## B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2017

## Sixth Semester

## Core Course—CONDENSED MATTER PHYSICS

[Common for B.Sc. Physics Model I, Physics Model II, Physics BEM and Physics Instrumentation]

(2013 Admission onwards)

Time : Three Hours

Maximum Marks : 60

## Part A

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

1. Most of the solids are ——— in nature.
2. The ——— arrangement in a crystal is called crystal structure.
3. The basis of copper and sodium crystalline solids has only ——— atom.
4. All the parallel equidistant planes have the same ——— indices.
5. Paramagnetic susceptibility is ——— and small.
6. Ferromagnetic materials are called ——— magnets.
7. A superconducting material behaves like a perfect ——— material.
8. A ——— film is a layer of material ranging from fractions of a nanometer to several micrometers in thickness.

 $(8 \times 1 = 8)$ 

## Part B

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

9. What are amorphous materials ?
10. Explain Bravais lattice.
11. Explain the term miller indices.
12. State Bragg's law.
13. What is metallic bonding ?
14. How does hcp structure differ from bcc structure ?
15. What are spin waves ?
16. Write the Clausius -Mossotti relation.
17. What is SQUID ?
18. What are nanomaterials ?

 $(6 \times 2 = 12)$ 

Turn over

## Part C

*Answer four questions.*

*Each question carries 4 marks.*

19. Copper has fcc structure and atomic radius is 0.1278nm, calculate its density.
20. Determine the miller indices and intercepts of the planes (3, 2, 2) and (1, 1, 1).
21. The glancing angle for the first order spectrum was observed to be  $8^\circ$  in Braggs x-ray spectrometer. Calculate the spacing between the planes if the wavelength is 0.078nm.
22. Magnetic susceptibility of a medium is  $948 \times 10^{-11}$ . Calculate the permeability and relative permeability of the medium.
23. A superconductivity material has a critical temperature of 8.7K in zero magnetic fields and a critical field of 0.0306 Tesla at 0K. Find the critical field at 2K.
24. Give an account on polymers.

(4 × 4 = 16)

## Part D

*Answer two questions.*

*Each question carries 12 marks.*

25. Describe the two and three dimensional lattice types.
26. Describe Hall Effect with the experimental setup.
27. Discuss the Kronig-Penney model of solids in detail.
28. Discuss Langevin's theory of paramagnetism.

(2 × 12 = 24)