

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MAY 2017**Second Semester****ELECTRIC AND MAGNETIC PHENOMENA THERMODYNAMICS AND ELEMENTARY SOLID STATE PHYSICS**

[Complementary Physics for B.Sc. Chemistry, B.Sc. Geology and B.Sc. Chemistry and Water Management]

(2013 Admission onwards)

Time : Three Hours

Maximum Marks : 60

Part A (Very Short Answer Questions)

Answer all questions.

Each question carries 1 mark.

1. Define dielectric susceptibility.
2. What is hysteresis loss ?
3. What are the features of linear and nonlinear magnetic materials ?
4. What is an amorphous solid ?
5. Explain the term lattice.
6. What is a thermodynamic system ?
7. State and explain the first law of thermodynamics.
8. Write down the equation for an isothermal process and explain.

(8 × 1 = 8)

Part B

Answer any six questions.

Each question carries 2 marks.

9. Briefly discuss on ferroelectricity.
10. Differentiate between paramagnetism and diamagnetism.
11. How does a hcp structure differ from bcc structure ? Explain.
12. Explain Bravais's lattice.
13. Obtain the expression for packing fraction for bcc.
14. Give the seven crystal systems.

Turn over

15. Identify reversible and irreversible changes.
16. Distinguish between isothermal and adiabatic processes.
17. Bring out the reversibility of Carnot cycle.
18. Explain the principle of increase of entropy.

(6 × 2 = 12)

Part C

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

19. The dielectric constant of a medium is 5. The electric displacement vector in it is $5 \times 10^{-12} \text{ C/m}^2$. Calculate the magnitude of electric field intensity in it.
20. The magnetic susceptibility of a medium is 948×10^{-11} . Calculate the permeability and relative permeability of the medium.
21. Obtain the lattice constants for bcc and fcc structures.
22. Determine the nearest neighbour distance in bcc crystal.
23. A gram molecule of xenon at 150°C suddenly expands to 10 times its original volume. Find the final temperature momentarily attained.
24. An ideal heat engine works between 450°C and 350°C received 4200 J of heat in a cycle. Calculate the amount of heat rejected. What is the thermal efficiency of the engine?

(4 × 4 = 16)

Part D

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

25. Discuss on ferromagnetism, ferrimagnetism and antiferromagnetism. Describe the salient features and applications of each one.
26. Discuss NaCl structure. Describe Bragg's law and experimental setup for crystal structure determination.
27. Describe entropy and allied phenomenon in detail.
28. Obtain the fundamental thermodynamic relations due to Maxwell. Give any two important applications of first relation.

(2 × 12 = 24)