

(CONTD ... 2)

SECTION – B

(5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Briefly explain the symmetry operations in crystals.
(OR)
b) Derive the expression for interplanar spacing in a cubic crystal.
12. a) Explain ionic bonding and energy formation of NaCl crystal.
(OR)
b) Analyze the Group velocity of harmonic wave trains.
13. a) Explain the Drude–Lorentz theory of electrical conduction.
(OR)
b) Write a note on Hall Effect and its applications.
14. a) Explain paramagnetism and its properties.
(OR)
b) Write short notes on Type I and II superconductors.
15. a) Explain the Probability theorem in statistical thermodynamics.
(OR)
b) Compare Maxwell–Boltzmann and Bose Einstein statistics.

SECTION – C

(5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

16. a) Calculate the packing fraction for SC, BCC and FCC structures.
(OR)
b) Describe the X-ray diffraction by Rotating crystal method. (K4)
17. a) Explain the various types of bonding in solids with their characteristics.
(OR)
b) Discuss lattice vibrations in a one-dimensional monoatomic and diatomic lattice. (K4)
18. a) Explain the Kronig–Penney model and formation of energy bands in solids.
(OR)
b) Distinguish between metal, insulator and semiconductor. (K5)
19. a) Explain ferromagnetism and formation of magnetic domains.
(OR)
b) Discuss the BCS theory of superconductivity. (K5)
20. a) Explain the concept of statistical equilibrium and most probable distribution.
(OR)
b) Derive Fermi–Dirac distribution law and explain its physical significance. (K4)
