

KANDASWAMI KANDAR'S COLLEGE, VELUR, NAMAKKAL.
DEPARTMENT OF PHYSICS
Model Examination – (December 2021)

III B.Sc. PHYSICS
Elective - Solid State Physics (19UPHE02)

Time: Three hours

Maximum: 75 marks

PART A – (15X1=15 Marks)

Answer ALL the questions

1. Coordination number for FCC crystal structure
a) 16 b) 12 c) 8 d) 4
2. Which of the following is not an amorphous material?
a) Glass b) Plastics c) Lead d) Rubbers
3. Bravais lattice consists of _____ space lattices.
a) Eleven b) Twelve c) Thirteen d) Fourteen
4. Schottky-defect in ceramic material is
a) Interstitial impurity b) Vacancy- interstitial pair of cations
c) Pair of nearby cation and anion vacancies d) Substitutional impurity
5. The atomic site from which an atom is missing is called
a) Vacancies b) Schottky defect c) Frenkel defect d) none of these
6. Which is used to find the magnitude and directions of dislocations in crystals
a) Bragg vector b) Burger vector c) Bravais vector d) Miller vector
7. What is the name of type I superconductor?
a) Hard superconductor b) Soft superconductor c) Dielectric superconductor
d) none of these
8. Which of the following is a property of a hard magnetic material?
a) Low hysteresis b) Low eddy loss c) Low coercive force d) High residual induction
9. A magnetic substance in which the permanent dipoles are present in the absence of an external magnetic field is
a) Ferro magnetic b) Diamagnetic c) Burger magnetic d) none of these
10. What is the value of dielectric constant of free space?
a) $8.854 \times 10^{-9} \text{ F m}^{-1}$ b) $8.854 \times 10^{-12} \text{ F m}^{-1}$ c) $8.854 \times 10^{-15} \text{ F m}^{-1}$ d) $8.854 \times 10^{-6} \text{ F m}^{-1}$
11. The value of electronic polarizability is
a) $4\pi\epsilon_0 R$ b) $4\pi\omega_0 R$ c) $4\pi\omega_0 R^2$ d) $4\pi\epsilon_0 R^2$
12. The dielectric polarization is defined as
a) $\epsilon_r = \epsilon/\epsilon_0$ b) $\epsilon_r = \epsilon_0/\epsilon$ c) $\epsilon_r = \epsilon + \epsilon_0$ d) $\epsilon_r = \epsilon \times \epsilon_0$
13. Ceramic is a good
a) conductor b) semiconductor c) insulator d) none of these
14. Which part of the crystal is used to transmit light signals without loss
a) core b) cladding c) outer jacket d) none of these
15. The material used as moderator in nuclear reactor is
a) Rubber b) glass c) graphite d) uranium

PART B – (2X5=10 Marks)

Answer any TWO questions out of Five

16. Calculate the atomic radius and packing factor of BCC structure.
17. State and explain Bragg's law. Also give its uses.
18. Discuss the Langevin's theory of diamagnetism.
19. Explain about the frequency and temperature effects on polarization.
20. Briefly explain the fiber optic materials and its importance.

PART C – (5X10=50 Marks)

Answer ALL questions

21. a) Describe the structure of HCP crystal and calculate the atomic radius and atomic packing factor. (or)
b) Describe the structure of sodium chloride crystal with neat diagram.
22. a) Describe the rotating photograph method to determine the crystal structure. (or)
b) Explain different line and surface defects.
23. a) Discuss the Langevin's theory of paramagnetism. (or)
b) Explain about the types and general properties of superconductors. Also give its applications.
24. a) Derive Claussius-Mosotti relation in dielectric subjected to static field. (or)
b) Write the properties of different types of dielectric materials.
25. a) Write a note on: a) Ceramics b) Metallic glasses. (or)
b) Discuss the structure, properties and applications of polymers.
