Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University) Coimbatore-641 043
Bachelor's Degree Examination – November-2018
V Semester

Class : III UG
Major : Physics

Time :3 hours
Max. Marks: 100

15BPHC15 Solid State Physics

Part-A **10 x 1=10**

Choose the correct answer

1. If r is the radius of the atom in a crystal, crystallizing in the simple cubic structure, then the nearest neighbor distance is
   a. r/2 b. 4r c. 2r d. r/4

2. The number of lattice points in a primitive cell are
   a. 1 b. 1/2 c. 2 d. 3/2

3. The packing factor of diamond cubic crystal structure is
   a. 60% b. 50% c. 90% d. none

4. -------- is defined as half the distance between the nearest neighboring atoms in a crystal
   a. coordination number b. atomic radius c. atomic packing
   d. packing factor

5. Which variety of copper has the best electrical conductivity?
   a. pure annealed copper b. hand drawn copper
   c. induction heated copper d. copper containing traces of silicon

6. The unit of Hall coefficient is
   a. $Nm^3A^{-1}wb^{-1}$ b. Nm^3Awb^{-1}
   c. $Nm^3A^{+1}wb^{-1}$ d. $Nm^2A^{-1}wb$

7. Magnetic susceptibility is
   a. χ = M b. χ = H/M c. χ = M/H d. χ = H

8. Curie-Weiss law is
   a. $\chi_m = C/T$ b. $\chi_m = C/\theta$
   c. $\chi_m = C/(T-\theta)$ d. $\chi_m = CT$

9. Dielectric materials are used primarily for
   a. insulation b. charge storage c. reducing dielectric loss d. none

10. The orientational polarizability per molecule in a polyatomic gas is proportional to
    a. T b. T^2 c. 1/T d. $1/T^2$

Part B **5 X 6=30**

Answer the following

Answer should not exceed 400 words or two pages

11. a. Explain primitive lattice cell & unit cell.

(or)

11. b. What are Bravais lattices? Name them.

12. a. What are the types of solids? Explain.

(or)

12. b. Define atomic radius in crystals. Calculate the atomic radii in the case of BCC & FCC lattices.

13. a. State and explain Wiedemann-Franz law.

(or)

13. b. What is Hall Effect? Explain.

14. a. Write short notes on ferromagnetic domains.

(or)

14. b. Write a note electron spin & magnetic moment.

15. a. Define: i) dielectric constant ii) electric polarization iii) polarization vector

(or)

15. b. Obtain the Clausius-Mosotti equation.

Part C **5 x 12=60**

Answer the following

Answer should not exceed 800 words or four pages

16. a. Discuss about symmetry elements of a crystalline solid.

(or)

16. b. Calculate the atomic packing factor for a SC and BCC structures.

17. a. Describe the structure of sodium chloride.

(or)

17. b. Describe the structure of diamond.

18. a. Derive an expression for the electrical conductivity of a metal.

(or)

18. b. Give an account on Kronig-Penny model.

19. a. Discuss about Langevin theory of paramagnetism.

(or)

19. b. Explain in detail about Bohr magneton.

20. a. Describe the evaluation of the local field for cubic structure.

(or)

20. b. Explain the phenomenon of electronic polarization in dielectrics.

****