Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University), Coimbatore-641 043

Master's Degree Examination – November 2018
I Semester

Class : I PG
Major : PYHSICS

Time: 3 hours
Max. Marks: 60

17MPHC04-Solid state Physics

Part A **10 x 1/2 = 5**

Choose the correct answer

1. The nearest neighbour distance in the case of fcc structure is ----------.
   a. a√3 /2 b. a√2 /2 c. a2 /√3 d. 2a /√2
2. Ewald found that the intensity of X- ray beams reflected from actual crystals was about -------- times greater than that expected from a perfect crystal.
   a. 10 b. 20 c. 30 d. 40
3. ----------dislocation occurs when the periodicity of the atomic lattice array is interrupted along certain directions in a crystal.
   a. Edge b. Screw c. Transient d. Frenkel
4. It is called an F centre because its name comes from the German word ----------which means colour.
   a. Farbe b. Forbe c. Force d. Firm
5. X-rays with wavelengths less than --------À are most useful in studying crystal.
   a. 1 b. 2 c. 3 d. 4
6. Every reciprocal lattice vector is ---------- to a lattice plane of the crystal lattice.
   a. normal b. parallel c. in phase d. along
7. Debye considered the vibrational modes of crystal as a ----------while Einstein considered the vibration of a single atom.
   a. whole b. part c. half d. one - third
8. Quantum of elastic energy is called ----------.
   a. photon b. phonon c. electron d. proton
9. The crystal growth give us information about the ----------of compounds.
   a. structure b. size c. number d. rotation
10. Melt method is used to produce ---------- crystals.
    a. single b. multiple c. poly d. unique

Part B

5 x 4 = 20

Answer ALL questions

Each answer should not exceed 200 words or one page

11.a. Get the structure factor for bcc lattice.

(Or)

11.b. Define and explain about the Brillouin zones.

12.a. State any four properties of reciprocal lattice.

(Or)

12.b. Explain the graphical construction of reciprocal lattice.

13.a. List out the four types of point defects and explain.

(Or)

13.b. Write a note on Frenkel defect.

14.a. Explain about the umklapp process.

(Or)

14.b. Give a note on photon momentum.

15.a. Explain the classical theory of nucleation.

(Or)

15.b. Compare homogeneous and heterogeneous nucleation.

Part C

5 x 7 = 35

Answer ALL questions

Each answer should not exceed 600 words or three pages

16.a. Explain about (i) diamond (ii) Nacl structure.

(Or)

16.b. Get the Bragg's condition in terms of reciprocal lattices.

17.a. Write a note on 'F' centres.

(Or)

17.b. Discuss about the production of colour centres by X- rays or particle irradiation.

18.a. Get the atomic form factor for bcc and fcc lattices.

(Or)

18.b. Obtain Laue's equations.

19.a. Describe about the inelastic scattering of neutrons by phonons.

(Or)

19.b. Explain the Einstein model of the lattice heat capacity.

20.a. Obtain Gibbs Thomson equation for vapour solution.

(Or)

20.b. Describe in detail about the melt crystal growth method.

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