KJ-541

M.Sc. (Physics)

3rd Semester Examination, June, 2020

Paper - III

Condensed Matter Physics - I

Time : Three Hours] [*Maximum Marks* : 80

Note : Answer **all** questions. All questions carry equal marks.

Unit-I

1. What are Bravais Lattices ? Explain two and three-dimensional Bravais Lattices with examples and write their properties.

OR

Discuss the interaction of X-rays with matter. Obtain Laue's equations for X-rays diffraction with crystal. Show that these are consistent with Bragg's law.

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Unit-II

2. What are colour centres ? Describe F-centre, V-centre and other colour centres. How they are produced ?

OR

Explain the role of dislocation in plastic deformation. Describe, how dislocations promote the growth of crystal. Discuss various growth patterns.

Unit-III

3. Write notes on the following :

(*a*) Effective mass of electron

(*b*) Cellular and pseudopotential method

OR

Describe the theory of de Haas-van Alphen effect. How the concept of Fermi surface can be explained by it ?

Unit-IV

4. Discuss in detail the Weiss theory of ferromagnetism. Also discuss the Heisenberg model in detail.

OR

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Write short notes on the following :

(*a*) Susceptibility below Neel's temperature

(*b*) Domain and Bloch wall energy

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