

Roll No. \_\_\_\_\_  
800 -/-/25/30

**February 2019**

M. Sc. IIIrd Semester Examination

**PHYSICS**

First Paper : Condensed Matter Physics - I

Time 3 Hours]

[Max. Marks : Regular 85 / Private 100

[Min. Marks : Regular 28 / Private 33

**Note : This question paper is meant for all Regular and Private students. Answer all five questions. All questions carry equal marks. The blind candidates will be given 60 minutes extra time.**

1. Discuss in detail Bravais lattices and two and three dimensions with examples.  
OR  
Describe diamond structure and sodium chloride structure in detail.
2. Discuss in detail relation between crystal lattice axes and crystal reciprocal lattice axes.  
OR  
Discuss dispersion relation and hence describe Brillouin zones.
3. Write short notes on any two of the following :
  - (a) Elastic Constants.
  - (b) Elastic Energy Density.
  - (c) Elastic constants for cubic isotropic bodies.
  - (d) Elastic stiffness constants for isotropic body.
4. Describe lattice vibrational spectrum in detail and also discuss the concept of phonons.  
OR  
Discuss in detail inelastic scattering of neutrons by phonons.
5. Write short notes on any two of the following :
  - (a) Thermal expansion and thermal conductivity.
  - (b) Band theory and classification of solids.
  - (c) Anomalous skin effect.
  - (d) Cyclotron resonance.