



61502

V Semester B.Sc. Examination, March/April 2022

(CBCS Scheme)

PHYSICS – VI

Astrophysics, Solid State Physics and Semiconductor Physics

Time : 3 Hours

Max. Marks : 70

Instructions : Answer **any five** questions from **each** Part.Non-programmable scientific calculators are **allowed**.

PART – A

Answer **any five** of the following. **Each** question carries **eight** marks : (5×8=40)

1. a) Define luminosity of a star and explain how it varies with the mass ?
b) Obtain an expression for the core temperature of a star using linear density model. (2+6)
2. a) Write any four general characteristics of main sequence star.
b) State and explain Virial theorem. (4+4)
3. a) State Moseley's law. Give any three applications of Moseley's law.
b) Obtain an expression for the interplanar spacing of a cubic crystal in terms of miller indices. (4+4)
4. a) What is hall effect in metals ?
b) Obtain an expression for the hall voltage and hall coefficient. (2+6)
5. a) Explain the phenomenon of superconductivity.
b) Give the differences between Type – I and Type – II superconductors. (4+4)
6. a) What are intrinsic semiconductors ?
b) Derive an expression for the electron concentration in the conduction band of an intrinsic semiconductor. (1+7)
7. a) Give the differences between Zener diode and ordinary diode.
b) With a circuit diagram, explain the working of Zener diode as a voltage regulator and hence obtain an expression for the minimum value of series resistance. (2+6)

P.T.O.