

2020

Time : 3 hours

Full Marks : 100

Pass Marks : 45

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer **five** questions, selecting **two** each from Group – A and Group – B, in which

Q. No 1 is compulsory.

1. Answer any **four** of the following questions :

5×4 = 20

- (a) Explain Bohr magneton and Gyromagnetic ratio.
- (b) Distinguish between Normal and Anomalous Zeeman effect.

- (c) Distinguish between Metal, Insulator and Semiconductor.
- (d) Discuss the B-H curve of Steel and Soft Iron.
- (e) Distinguish between Amorphous and Crystalline Materials.
- (f) What do you mean by Brillouin Zones ?

Group – A

- 2. State Weizsacker Semi-empirical mass formula. Discuss the physical meaning of each term involved in this formula. 20
- 3. What is a Betatron ? Describe the principle, construction and working of it. 20
- 4. Describe a G. M counter and explain its working . Draw a typical characteristic curve for a G. M. tube and discuss its shape. 20
- 5. What are cosmic ray showers ? Explain the Cascade theory of origin of cosmic rays. 20

Group – B

6. State and explain the terms thermal and electrical conductivities of metal and establish Widemann – Franz relation between them. 20
7. What is Hall effect ? Obtain an expression for Hall Co-efficient and its experimental determination. 20
8. What is a reciprocal lattice ? Show that the bcc lattice is the reciprocal of the fcc lattice. 20
9. Mention main features of ferro-magnetic substances. Discuss the Weiss theory of Ferromagnetism. 20

