

[This question paper contains 3 printed pages.]

1916

Your Roll No.

B.Sc. Prog./III

E

Paper PH-301 : Physics of Materials & Electronics

Time : 3 Hours

Maximum Marks : 75

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt five questions in all, selecting
at least two questions from each section.*

All questions carry equal marks.

SECTION-A

- (a) What is the Bragg's diffraction law? Explain any one of the X-ray diffraction method. (10)

(b) What are Brillouin zones? Discuss the Brillouin zone for 1-D lattice. (5)
- (a) What is Hall effect? Describe the experimental setup with the necessary theory for the determination of Hall coefficient. (12)

(b) What does Hall coefficient signify? (3)

P.T.O.

3. (a) Describe B-H hysteresis loop? (12)
(b) How is hysteresis curve used for selecting the material for the construction of a permanent magnet? (3)
4. (a) How are solids classified according to Band Theory? Draw the energy band diagrams for conductors, insulators and semi-conductors. (12)
(b) How does the resistivity of semiconductor vary with temperature? (3)

SECTION-B

5. (a) Explain the working of a bridge rectifier and find its ripple factor, rectification efficiency and PIV. (10)
(b) Explain the working of L filter. (5)
6. (a) Draw the circuit diagram of npn transistor in CE configuration and explain its input and output characteristics. Show active, saturation and cut-off regions. (10)
(b) Derive relation between various gains α , β and γ . (5)
7. (a) What is a UJT? Describe its working and characteristics. (8)

- (b) Explain how a UJT can be used as a relaxation oscillator. (7)
8. (a) Discuss Langevin's theory of paramagnetism and derive an expression for the magnetization of the material. (10)
- (b) State Curie's law for paramagnetic material and derive it from the Langevin's theory. (5)