

NOVEMBER/DECEMBER 2019

BEL31— PHYSICS OF MATERIALS

Time : Three hours

Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. What is an Ionic bond?
2. What is a Basis?
3. State Bragg's law.
4. What are soft X- rays?
5. State Matheissen's rule.
6. What is relaxation time?
7. What is an intrinsic semiconductor?
8. What is doping?
9. What is forward bias?
10. Define depletion region.



SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Explain the seven crystal system.
Or
(b) Explain Bravais lattice.
12. (a) Explain the determination of crystal structure using powder methods.
Or
(b) Explain the determination of crystal structure using Single crystal methods.
13. (a) Derive an expression for mean free path and relaxation time.
Or
(b) Explain Wiedman-Franz law.
14. (a) Explain the Law of mass action.
Or
(b) Derive an expression for electron concentration in intrinsic semiconductors.
15. (a) Derive an expression for potential barriers.
Or
(b) What is drift velocity and derive an expression for it.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain the determination Miller indices.
17. Discuss the working of Bragg's spectrometer — Discuss.
18. Describe the Fermi level in n type and p type semiconductor
19. Explain classification of solids on the basis of energy band theory.
20. Discuss the Hall effect, Hall voltage and Hall coefficient in detail.

