

NOVEMBER/DECEMBER 2018

**BEL31 — PHYSICS OF MATERIALS**

Time : Three hours

Maximum : 75 marks

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

Answer ALL questions.

1. What is a covalent bond?
2. What is a lattice?
3. State Bragg's law.
4. What are Hard X-rays?
5. State Ohm's Law.
6. What is relaxation time?
7. State Wiedman-Franz Law.
8. What is an impurity and state its role?
9. What is reverse bias?
10. Define width of a depletion region.



SECTION B — ( $5 \times 5 = 25$  marks)

Answer ALL questions.

11. (a) Explain Unit cell and Primitive cell.  
Or  
(b) Explain Hydrogen bond formation.
12. (a) Explain the determination of crystal structure using single crystal methods.  
Or  
(b) Explain the determination of crystal structure using Powder crystal methods.
13. (a) Derive an expression for Mean free path and relaxation time.  
Or  
(b) Explain Drude-Lorentz theory.
14. (a) Explain the bonds in semiconductors.  
Or  
(b) Derive an expression for electron concentration in extrinsic semiconductors.
15. (a) Derive an expression for width of depletion region.  
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. Explain Laue's, Rotating crystal method.
18. Explain the Free electron theory of metals.
19. Explain classification of solids on the basis of energy band theory.
20. Explain the experimental determination of Hall coefficient and give its applications.

