19103200

QP CODE: 19103200

Reg No : .....

Name : .....

B.Sc.DEGREE (CBCS) EXAMINATION, NOVEMBER 2019

First Semester

B.Sc Electronics Model III

Complementary Course - PH1CMT03 - PHYSICS-SOLID STATE PHYSICS

2017 Admission Onwards

EA4A436E

Time: 3 Hours Maximum Marks :80

Part A

Answer any ten questions.

Each question carries 2 marks.

1. What are Miller indices?
2. Why covalent bond is most common and strongest among bonds?
3. What is the importance of Schrödinger's equation?
4. Why Schrödinger's equation is linear in the wave function, y?
5. What do you mean by free electron gas model?
6. What do you mean by Fermi surface?
7. What is Bloch theorem?
8. What are donor and acceptor impurities?
9. What is mobility in semiconductors?
10. Why carrier concentration of holes and electrons are same in an intrinsic semiconductor?
11. What is superconductivity?
12. Give the expression for critical field in superconductivity.

(10×2=20)

Part B

Answer any six questions.

Each question carries 5 marks.

13. Define: 1. Unit Cell 2. Bravais lattice with proper illustrations
14. Explain the concept of dual nature of matter and derive the expression for de Broglie waves.

15. Show that $y = Ae^{-i\omega(t-x/v)}$ is a solution of the wave equation $\frac{\partial^2 y}{\partial x^2} = \frac{1}{v^2}\frac{\partial^2 y}{\partial t^2}$

16. Derive the expression for conductivity in metals.

17. Explain the classification of materials according to band theory concept and band gap energy.

18. With proper mathematical formulations, explain the law of mass action.

19. Explain Hall coefficient and its significance.

20. Explain how magnetic materials are classified according to magnetic susceptibility?

21. Describe the cause and features of ferromagnetic domains.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. Explain the 14 Bravais lattices in crystal systems

23. Draw and explain the experimental set up to conduct Davisson-Germer experiment to confirm the presence of matter waves

24. Explain the energy band structure in atoms, molecules and solids. Explain the band structure in metals, insulators and semiconductors.

25. Explain the energy band structure of an intrinsic and extrinsic semiconductor

(2×15=30)