QP CODE: 18103801

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Reg No : .....

Name : .....

B.Sc.DEGREE(CBCS)EXAMINATION, DECEMBER 2018

First Semester

B.Sc Electronics Model III

Complementary Course - PH1CMT03 - PHYSICS-SOLID STATE PHYSICS

2018 Admission only

C66087D1

Maximum Marks: 80 **Time: 3 Hours**

Part A

Answer any **ten** questions.

Each question carries **2** marks.

1. What is the objective of rotating-crystal method experiment?
2. What is covalent bonding and give one example?
3. Compare between classical mechanics and quantum mechanics.
4. Define wave function, y
5. What do you mean by free electron gas model?
6. What is Fermi level energy?
7. What do you mean by Fermi surface?
8. What do you mean by an intrinsic semiconductor?
9. What is law of mass action?
10. Give any one application of determining Hall coefficient.
11. Define gyromagnetic ratio.
12. Give the importance of magnetic hysterisis.

(10×2=20)

Part B

Answer any **six** questions.

Each question carries **5** marks.

13. Draw the crytal planes for a cubic lattice with Miller indices: a. (1 0 0) b. (0 0 1) c. (0 1 0)
14. Derive the expression for de Broglie waves. Calculate the de Broglie wavelength associated with an electron which is accelarated in a 100 KeV potential.

15. Write the Schrödinger's equation in time dependant and steady state form. Explain the significaance of Schrödinger's equation.

16. Explain how energy bands are formed in solids.

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

18. Explain the conduction and valence band energies in a semiconductor.

19. Explain drift velocity, mean life time and mobility of charge carriers.

20. Explain antiferromagnetism and ferrimagnetism in materials.

21. Distinguish between Type I and Type II superconductors.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **15** marks.

22. What are the various properties of a crystal that will make it a perfect solid?

23. Explain Davisson-Germer experiment to confirm 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 carrier concentration in a pure semiconductor material with necessary mathematical expressions.

(2×15=30)