QP CODE: 23104795

Reg No   :   ....

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B.Sc DEGREE (CBCS) REGULAR/IMPROVEMENT/REAPPEARANCE EXAMINATIONS, FEBRUARY 2023

First Semester

B.Sc Electronics Model III

Complementary Course - PH1CMT03 - PHYSICS-SOLID STATE PHYSICS

2017 Admission Onwards

A6600F45

Time: 3 Hours

Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Define the properties of a crystal.

2. What is ionic bonding and give one example?

3. Give the basic principle of Davisson- Germer experiment.

4. Give the relation between uncertainty in energy and time.

5. What is Fermi level energy?

6. Give the expression for Fermi-Dirac distribution function.

7. Draw the energy band picture of metals, semiconductors and insulators.

8. What do you mean by an extrinsic semiconductor?

9. What do you mean by drift velocity of carriers?

10. Give the expression for carrier concentration in an intrinsic semiconductor.

11. Explain Curie temparature with appropriate equations.

12. What is Meissner effect?

(10×2=20)

Part B

*Answer any **six** questions.*

13. Explain how distance between parallel planes can be found out using Miller indices.

14. Give a comparison between classical mechanics and quantum mechanics.

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. Explain the free electron gas theory of metals.

17. Explain the concept of Energy bands and band splitting in solids.

18. What are semiconductors? Explain the bonding in semiconductors.

19. What is law of mass action? Explain the mathematical expression for the law.

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

21. Explain some of the applications of superconductivity.

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Explain the 14 Bravais lattices in crystal systems.

23. Derive the Schrödinger's wave equation in time dependant form.

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

25. What is Hall effect? Derive the expression for Hall coefficient.

(2×15=30)