

F 2357

Reg. No.....

Name.....

Ph.D. COURSE WORK EXAMINATION IN PHYSICS, OCTOBER 2022

Course II-THEORY AND CONCEPT—PHYSICS

(2020 Admissions)

Time : Three Hours

Maximum : 50 Marks

Part A

Answer any ten of the following questions.

Each question carries 4 marks.

1. State and prove Bloch's theorem.
2. Explain the phenomenon of red shift.
3. Explain the mechanism of random movement of holes in a semiconductor crystal.
4. Discuss the charge conjugation of Klein-Gordon equation.
5. Give an account of second harmonic generation of non-linear optics.
6. Write a short note on electromagnetic field tensor.
7. What is the Hall effect ? Obtain the formula to calculate the hall coefficient ?
8. What are space-time diagrams ? Explain.
9. Give the significance of covariance of Dirac equation.
10. Explain Noether's theorem.
11. Give the fundamental equations of cosmology.
12. Explain the propagation of electromagnetic wave through nonlinear media.

(10 × 4 = 40 marks)

Part B

Answer any one question.

The question carries 10 marks.

13. Derive an expression to show the effect of temperature on Fermi Dirac distribution function.
14. Explain how Klein-Gordon equation leads to positive and negative probability density values.

(1 × 10 = 10 marks)