

Roll No.

25-PH-23

**M.Sc. II SEMESTER [MAIN/ATKT] EXAMINATION  
MAY - JUNE 2025**

**PHYSICS**

Paper - III

**[Electrodynamics and Plasma Physics]**

[Max. Marks : 75]

[Time : 3:00 Hrs.]

[Min. Marks : 26]

**Note :** Candidate should write his/her Roll Number at the prescribed space on the question paper.  
Student should not write anything on question paper.  
Attempt all five questions. Each question carries an internal choice.  
Each question carries **15 marks**.

- Q. 1** Describe the basic of electrostatics and magnetostatics with units and what are the statement of Laplace equation and derive it. (15 Marks)

**OR**

Define the moving charge particle in uniform motion and electrostatics field of an accelerated charge particle at low and high velocity and describe angular distribution of power radiated. (15 Marks)

- Q. 2 a)** Describe the Four Vector and Lorentz transformation in 4-dimension spaces. (7½ Marks)

- b)** Write the invariance of electric charge particle of E and H field and electromagnetic field. (7½ Marks)

**OR**

- a)** Write the statement of Lagrangian equation and prove it. (8 Marks)

- b)** Describe the electro magnetic Tensor and their formulation lead to covariance of electrodynamics. (7 Marks)

- Q. 3** Write and explain the elementary concept occurrence of plasma and their production and parameters. (15 Marks)

**OR**

- a)** What are the Debye screening distance and explain it. (7 Marks)

- b)** Explain transverse and longitudinal oscillation. (8 Marks)

- Q. 4** Write the statement of Magneto - Hydro Dynamics Physics and prove it. Explain hydrodynamics waves. (15 Marks)

P.T.O.

**OR**

Write down the particle orbits and drift motion in a plasma and describe the experimental study of plasma. (15 Marks)

**Q. 5** Write short note on **any two** - (7½ + 7½ Marks)

- i) Explain Scalar and Vector Potential.
- ii) E.M. Tensor in 4 - Dimensional.
- iii) Pinch effect instability in plasma Column.
- iv) Single particle motion in uniform and non - uniform E and B field.

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