Roll No. .....

(05/24)

15422

M. Sc. EXAMINATION

(For Batch 2021 & Onwards)

(Third Semester)

PHYSICS

MSc/Phy/3/CC13-A

Electrodynamics and Plasma Physics

Time : Three Hours *Maximum Marks : 70*

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

1. Explain the following in brief : 5×2=10

   (i) Cold and hot plasma

   (ii) Electricity generation by plasma

   (iii) Cherenkov radiation

(iv) Lienard-Wiechert potentials

(v) Electromagnetic field tensor.

Unit I

2. What is Solar Wind ? Derive the equations of motion of an electron and positive charge ion under constant and uniform electric field. 15

3. Derive the equation of motion for the trajectory of a charged particle under crossed uniform and constant electric and magnetic fields. 15

Unit II

4. Derive the equation of motion of a relativistic moving charged particle under constant electric and magnetic fields. 15

5. Derive the equations of motion for relativistic energy and momentum of a moving particle. 15

Unit III

6. What are four vectors in electrodynamics ? Discuss four-current density and four-potential with in the framework of covariant formulation of electrodynamics. 15

7. Write short notes on the following :

(i) Transformation of e.m. fields 8

(ii) Invariants of e.m. fields. 7

Unit IV

8. Derive the expressions for e.m. field produced by a charged particle in uniform motion. 15

9. Obtain the radiated power from a charged particle with collinear velocity and acceleration. What is Bremsstrahlung ? 15