



QP CODE: 26019653



26019653

Reg No :

Name :

M.Sc DEGREE (CSS) EXAMINATION, MARCH 2026

Fourth Semester

MSC Space Science

ELECTIVE - PH880402 - PLASMA PHYSICS

2020 Admission Onwards

545E572D

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. Why Plasma is treated as the 'fourth state of matter'?
2. What is a Debye Sphere?
3. Define Grad B drift.
4. What do you meant by guiding center in single particle orbit theory?
5. Write the Navier – Stoke's formula.
6. What is plasma oscillation? Write the expression for plasma frequency.
7. What are electron plasma waves?
8. What do you meant by Alfven wave?
9. What is Rayleigh-Taylor instability?
10. Write the nonlinear Schrodinger equation and give its significance.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Write a short note on (i) Plasma in solar corona (ii) Plasma in the core of sun.
12. Discuss the concept of temperature of a plasma using Maxwell Boltzmann distribution.
13. Discuss the concept of plasma magnetic mirror.
14. Define lower hybrid frequency and derive an expression for the same.





15. Briefly discuss the cutoffs and resonances of an extraordinary wave in plasma environment.
16. Define the concept of β in plasma and how it connected with the diamagnetic effect.
17. Discuss the physical mechanism of weibel instability.
18. Briefly discuss the characteristics of (i) shock waves (ii) double layers.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Derive an expression for drift velocity of charged particle placed in a sinusoidal electric field along with a uniform magnetic field.
20. Discuss the motion of particle in a time varying electric and uniform magnetic field.
21. Discuss the Stress Tensor of plasma.
22. Discuss the frequency matching and instability growth rate of parametric instability.

(2×5=10 weightage)

