25

453424

D 52839

(Pages : 2)

Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2023

(CBCSS)

Physics

PHY IC 03—ELECTRODYNAMICS AND PLASMA PHYSICS

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

Section A

8 short questions, each answerable within 7.5 minutes.
Answer **all** *questions, each question carries 1 weightage.*

1. What is the intrinsic impedance of the free space ? Give the equation.
2. Define group velocity.
3. What is Poynting vector ?
4. Define total reflection, critical angle and the equation for critical angle.
5. Define a) Propagation constant ; b) Attenuation constant ; and c) Phase constant.
6. What is the constitution of ionosphere ?
7. What is Plasma ?
8. Define displacement current

(8 × 1 = 8 weightage)

Section B

4 essay questions, each answerable within 30 minutes.
Answer any **two** *questions, each question carries weightage 5.*

9. Explain polarization of a plain wave and derive the equation .Explain circularly polarized waves what is meant by negative circularly polarization.
10. Analyse the behaviour of transverse magnetic waves allow uniform guiding structures.

Turn over

11. Explain plasma fluid equations.

12. Explain Maxwell's equations. In detail, explain boundary conditions of electrodyna

(2 × 5 = 1

Section C

7 problems answerable within 15 minutes.

Answer any **four** *questions, each question carries weightage 3.*

13. Prove that a linearly polarized plain wave can be resolved into a right hand circula wave and left hand circularly polarized wave of equal amplitude

14. It has been estimated that the spacecraft renters the Earth's atmosphere the surro and molecules create plasma, electron density is in the neighborhood of 2×10^8 per the plasmas effect on frequency usage in radio communication between the space mission controllers on earth.

15. A uniform plane wave in a loss less medium with intrinsic impedancet $\eta 1$ incident a another lossless medium with intrinsic impedance $\eta 2$ through a plane boundar expression for the time average power densities in both media.

16. Write a transmission line equations for a loss plus parallel plate line supporting TE

17. Derive the motion of plasma in time varying B field.

18. Compute λ_D and λ_D for the following cases :

    a) A glow discharge with $n = 10^{16}$ m^{-3} KTe = 2 eV

    b) Earth's ionosphere with $n = 10^{12}$ m^{-3} KTe = 0.1 eV

    c) A θ pinch with $n = 10^{23}$ m^{-3} KTe = 800 eV

19. With figure explain Debye shielding

(4 × 3 = 12