K21P 4198

Reg. No. : .....

Name : .....

I Semester M.Sc. Degree (C.B.S.S. – Reg./Supple./Imp.) Examination, October 2021
(2018 Admission Onwards)
PHYSICS
PHY1C03 : Electrodynamics

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **both** questions either **a** or **b**. **Each** question carries **12** marks.

I. a) Explain reflection and refraction of vertically polarized wave. Derive expressions for the reflection and refraction coefficient.

OR

b) Discuss the motion of charged particles in uniform $E^{\rightarrow}$ and $B^{\rightarrow}$ fields.

II. a) Explain Guage transformations. Obtain the Lorentz Guage condition.

OR

b) Derive the electromagnetic field tensor which is consistent with the equation of charge continuity. **(2×12=24)**

SECTION – B

Answer **any four** questions. Question **(a)** carries **1** mark, **(b)** carries **3** marks, **(c)** carries **5** marks.

III. a) Define the electric scalar potential.

b) Show that the electric field generated by a stationary charge is a conservative field.

c) Explain Gauss's law in electrostatics.

IV. a) State Poynting's theorem.

b) What is the significance of the Poynting's vector ?

c) Derive the Poynting theorem.

P.T.O.

V. a) What is a wave guide ?

b) For a rectangular wave guide with a wall separation of 0.03m and desired frequency of operation of 6 Ghz. Calculate the cut off frequency and cut off wavelength.

c) Explain the TE and TM mode of propagation.

VI. a) What is a Hertizan dipole ?

b) Explain radiation resistance of a Hertizan dipole antenna.

c) Discuss Magnetic dipole radiation and arrive at the equation for magnetic dipole radiation.

VII. a) What is radiation reaction ?

b) Explain the significance of radiation reaction.

c) Derive the Abraham Lorentz formula.

VIII. a) What are the types of polarization ?

b) Explain Brewsters angle.

c) Prove the Snell's law of refraction for oblique incidence. **(4×9=36)**
