Subject Code—61384

B. Sc. EXAMINATION

(Batch 2019 Onwards)

(Main & Re-appear)

(Second Semester)

PHYSICS

CPL-203

Electricity, Magnetism and EMT-II

Time : 3 *Hours* *Maximum Marks* : 80

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

(Compulsory Question)

1. (a) Define coefficient of mutual induction. Give the unit in which it is measured.

(b) What is the importance of quality factor ? Write its unit.

(c) State Poynting theorem.

(d) What is Displacement Current ? Give its unit.

(e) What is Brewster angle ? Give its *two* applications.

(f) Write the mathematical expression for INtrinsic Impedance for free space and medium.

(g) Define Hertzian dipole.

(h) Write the advantage and disadvantage of Coulomb Gauge Transformation. 8×2=16

Unit I

2. (a) Explain Faraday's law of Electromagnetic Induction. 4

(b) Find quality factor of series resonant circuit. 12

3. Derive an expression for impedance in L-R-C series A.C. Circuit. Discuss its special cases for different frequencies. **16**

Unit II

4. Derive Maxwell's Third equation and Maxwell's Fourth equation. **16**

5. Derive expression for Poynting vector and Propagating Energy. **16**

Unit III

6. Find wave equation for Electric field and Magnetic field. Hence derive : **16**

$$C = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$$

7. Find Reflection and Transmission coefficient at Normal incidence of Electromagnetic waves in terms :

   (i) of Amplitude

   (ii) of Refractive Index

   (iii) of Energy. **16**

Unit IV

8. Derive an expression for Transformation of Magnetic fields between two inertial frames. **16**

9. Write short notes on the following :

   (a) Gauge Transformation **8**

   (b) Lorentz's Transformation. **8**