UNIVERSITY DEPARTMENT OF PHYSICS

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B.SC. PHYSICS HONS.

SEMESTER - IV

PAPER – CC X: ELECTRO-MAGNETIC THEORY

MODEL QUESTIONS

GROUP- A

Short Answer Type Questions.

1. What are scalar and vector potentials?
2. Find the differential equation of Ampere's Circuital Law, hence derive formula:
   ∇ X H = J + $\frac{dD}{dt}$
3. What are normal and anomalous dispersion?
4. Prove that E, H, and K forms an orthogonal set in electromagnetic wave.
5. What is Brewester's law?
6. What is displacement current?

GROUP- B

Long Answer Type Questions.

1. Discuss the propagation of electromagnetic wave in a conducting medium. What is skin depth?
2. Discuss the plane wave propagation in a dielectric medium. What is the velocity of the wave in the dielectric medium?
3. Explain the dispersion of electromagnetic wave. How does normal and anomalous dispersion is explained.
4. Derive electromagnetic equations in terms of scalar and vector potentials. What is Lorentz Gauge? Also explain Gauge Invariance.
5. Derive radiation emitted from accelerated charge particle along perpendicular direction of propagation.
6. Derive the energy equation of electromagnetic wave in air. What is Poynting vector, give its physical meaning.

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