



M 26098

Reg. No. : .....

Name : .....

**Third Semester M.A./M.Sc./M.Com. Degree (Reg./Sup./Imp.)**

**Examination, November 2014**

**PHYSICS (2009 Admn. Onwards)**

**PH 302 : Electrodynamics**

Time : 3 Hours

Max. Marks : 50

**SECTION – A**

Answer **any two** questions. **Each** question carries **10** marks.

1. Show that a plane wave incident normally on a perfectly conducting boundary surface suffers reflection to produce standing waves having  $90^\circ$  phase difference between E and H.
2. State and explain Ampere's circuital law. Use it to calculate the field due to an infinitely long conductor.
3. Derive the expression for momentum of charged particles using the Lorentz force equation.
4. Discuss the Lorentz dispersion model. Explain the parameters of the equations.  
What is the limitation of the model ? (2×10=20)

**SECTION – B**

Answer **any five** questions. **Each** question carries **3** marks.

5. What is a rectangular wave guide ? Represent the electric field and magnetic field boundary conditions.
6. What is Brewster's angle ? Explain the significance of Brewster's angle.
7. Explain positive helicity of circularly polarised waves.
8. What is electric dipole radiation ?
9. Explain the concept of geometry of space time.

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10. Define Plasma oscillations and Plasma frequency. On what factors does the plasma frequency depend ?
11. Explain negative helicity of circularly polarised waves.
12. Explain the terms four vector potential. (5×3=15)

**SECTION - C**

Answer **any three** questions. **Each** question carries **5** marks.

13. Derive the inhomogeneous wave equations in terms of scalar potential  $Q$  and vector potential  $A$  using Maxwell's equations.
14. Derive the transverse plane wave solutions of Maxwell's equations in a non-conducting media.
15. Obtain the Abraham Lorentz equation of motion. Give its significance.
16. Derive an expression for the power radiated by a point charge.
17. Obtain the Cauchy relation for refractive index of a transparent material. (3×5=15)

**SECTION - B**

Answer any five questions. Each question carries 8 marks.

1. What is a rectangular wave guide? Represent the electric field and magnetic field boundary conditions.

2. What is Brewster's angle? Explain the significance of Brewster's angle.

3. Explain positive helicity of circularly polarised waves.

4. What is electric dipole radiation?

5. Explain the concept of geometry of space time.