

S.No. 7380

PN 15 PY 4

(For candidates admitted from 2015–2016 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Physics

ELECTROMAGNETIC THEORY

Time : Three hours

Maximum : 100 marks

SECTION A — ($10 \times 2 = 20$)

Answer ALL questions.

1. Define Coulomb's law.
2. What is meant by electric potential?
3. Write about "dielectric"?
4. What is molecular polarizability?
5. Write an equation of macroscopic particle.
6. Define "magnetic moment"?
7. Write a principle of Larenty Gauge.
8. Write about conservation of energy?
9. Express Reflection coefficient of electromagnetic waves?
10. Define "Linear polarization"?

SECTION B — ($5 \times 7 = 35$)

Answer ALL questions, choosing either (a) or (b).

11. (a) Derive the expression for Green's theorem with an example.
Or
(b) Derive the Electrostatic boundary value problems for a grounded conducting sphere?
12. (a) Differentiate between Molecular polarizability and electric susceptibility.
Or
(b) Explain about Electrostatic energy in dielectric media?
13. (a) Express the magnetostatics using force between current carrying conductors.
Or
(b) Differentiate between Force and torque with an example.
14. (a) Draw and construct a coulomb Gauge?
Or
(b) Express Maxwell's displacement current with suitable examples?
15. (a) Differentiate between Linear and circular polarization.
Or
(b) Discuss about wave propagation in optical fibers?

SECTION C — ($3 \times 15 = 45$)

Answer any THREE questions.

16. Explain about Dirichlet and Neumann boundary conditions. Derive its equations.
17. Illustrate the conditions of boundary value problems with.
(a) Dielectric sphere in a uniform electric field and
(b) Spherical cavity in dielectric medium.
18. Define
(a) Ampere's law
(b) Biot and Savart law.
(c) Magnetic moment.
19. Explain Gauge transformation with Coulomb Gauge and Lorentz Gauge?
20. (a) Discuss about plane waves in non-conducting medium?
(b) Briefly discuss Reflection and Refraction of em waves.