

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2025

(Regular/Improvement/Supplementary)

PHYSICS

GPHY4B04T: ELECTRODYNAMICS - II

Time: 2 Hours

Maximum Marks: 60

SECTION A: Answer the following questions. Each carries two marks.**(Ceiling 20 marks)**

1. What is self inductor? Derive an expression for energy stored in an inductor?
2. Give the properties of electromagnetic waves.
3. Define plane wave.
4. What is meant by polarisation of a wave and what does it indicate?
5. How does the displacement current account for the propagation of e.m. waves?
6. Show that the active electric field can be expressed as a combination of scalar and vector potentials.
7. Explain the concept Coulomb's gauge?
8. State the condition under which a moving coil galvanometer is ballistic?
9. What is a choke coil? What is its advantage over pure resistance?
10. State Thevenin's theorem. Explain the necessary procedure for Thevenising a network.
11. Explain how Crammer's rule is used to solve the simultaneous equations having three unknowns.
12. State and explain Kirchhoff's laws?

SECTION B: Answer the following questions. Each carries five marks.**(Ceiling 30 marks)**

13. Explain how Maxwell modified Ampere's law? Write down Maxwell's equation in free space?
14. Find energy stored in a section of length " l " of a solenoid having resistance R , carrying a current " I ". Here, " n " is the number of turns per unit length.
15. What are double energy transients?
16. A capacitor 0.01 micro farad is charged through an inductance 10 milli Henry and a resistance of 1000 ohms using a DC source. Calculate frequency of oscillations? What is the additional resistance that should be added so that the oscillation may stop?
17. A series LCR circuit comprises of an inductance of 0.5 μH , a capacitor of 40 μF and a resistance of 100 Ω connected to an ac source. Find the resonant frequency, lower and upper half power frequencies? Also find voltage magnification of the circuit when tuned to resonance?
18. Show that the current through a capacitor leads applied ac e.m.f by $(\pi/2)$.
19. State and prove Maximum power transfer theorem?

SECTION C: Answer any one question. The question carries ten marks.

20. Describe motional e.m.f. State and prove flux rule for motional e.m.f.
21. State and prove Poynting theorem.

(1 × 10 = 10 Marks)