

D 120581

(Pages : 2)

Name.....

Reg. No.....

**FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2025**

Physics/Applied Physics

PHY4B04/APH4B04—ELECTRODYNAMICS—II

(2019—2023 Admissions)

Time : Two Hours

Maximum : 60 Marks

*The symbols used in this question paper have their usual meanings.***Section A (Short Answer Type)***Answer questions in two **or** three sentences.**Each correct answer carries a maximum of 2 marks.**All question can be attended.*

1. How can the refractive index of a medium be obtained from basic electro-magnetic constants ?
2. Discuss the growth of current in a CR circuit ?
3. Compare series LCR resonant circuit and parallel LCR resonant circuit.
4. What is an ideal constant voltage source ?
5. Discuss Faraday's laws of electromagnetic induction.
6. Write down Poynting theorem.
7. What is meant by the logarithmic decrement in a moving coil galvanometer ?
8. State superposition theorem.
9. State Gauss' Law.
10. If a capacitor of 500 nF is connected in series with a resistance of $50\ \Omega$ and 10 V d.c. supply, find the time constant.

Turn over

11. Explain polarization of electromagnetic waves.
12. Write the boundary conditions for E , B , D and H , at a boundary between two different media.

(Ceiling 20 marks)

Section B (Paragraph / Problem Type)

*Answer questions in a paragraph of about **half a page** to one page.*

Each correct answer carries a maximum of 5 marks.

13. State Lenz's law. Obtain the expression for energy stored in an inductor.
14. Give a brief account of magnetic charge.
15. Describe with vector diagram, how the impedance of an LCR series circuit is expressed in terms of j -operator.
16. Find the electric field a distance z above the midpoint between two equal charges (q), a distance d apart.
17. A coil of self inductance 2.5 H is joined to the terminals of a 2 V battery through a resistance of 5Ω . Find the time constant of the circuit. What is the maximum current attained in the circuit?
18. Find the capacitive reactance of a $15 \mu\text{F}$ capacitor at 2000 Hz . Calculate the inductance required to produce series resonance with the capacitor at this frequency.
19. Draw and explain with circuit diagram, the decay of current in an L-R circuit.

(Ceiling 30 marks)

Section C (Essay Type)

*(Essays - Answer in about **two pages**, any **one** question.*

Answer carries 10 marks).

20. Define the charge sensitiveness of BG. With necessary theory, describe an experiment to determine the charge sensitiveness of BG using standard condenser and HMS.
21. (a) Derive an expression for the energy of a continuous charge distribution.
(b) Obtain Gauss' law in dielectrics.

($1 \times 10 = 10$ marks)