D 103069   **(Pages : 2)**   Name..

Reg. No...

FOURTH SEMESTER (CBCSS–UG) DEGREE EXAMINATION
APRIL 2024

Physics/Applied Physics

PHY4B04.APH4B04—ELECTRODYNAMICS – II

(2019 Admission onwards)

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 *questions can be attended.*

1. Write down the differential and integral forms of Faraday's law.

2. Explain polarization of electromagnetic waves.

3. What are the conditions for a moving coil galvanometer to be ballistic ?

4. Draw the circuit diagram for obtaining balance using Anderson's bridge.

5. State Thevenin's theorem.

6. Write down general wave equation. Give its solution.

7. Write down Maxwell's equations inside matter.

8. What is the power factor in inductor-resistor series circuit ?

9. Write down the dimensions of electric flux.

10. How do the energy density and momentum density of electromagnetic waves relate to Poyntings vector ?

11. Define the r.m.s value of e.m.f.

12. How can the refractive index of a medium be obtained from basic electro-magnetic constants ?

(Ceiling 20 marks)

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Section B – Paragraph Problem type

All questions can be attended.
Answer questions in a paragraph of about half a page
to one page, each correct answer carries a maximum of 5 marks.

13. Draw and explain circuit diagram for decay of current in L-R circuit.

14. Explain mutual inductance and obtain Neumann's formula for the same.

15. Find the field outside a uniformly charged solid sphere of radius R and total charge q.

16. A coil having a resistance of 10 Ω and inductance 4 H is connected to a dc source of e.m.f. 100 V. How long does it take for the voltage across the resistance to attain a value of 50 V ?

17. A choke of 0.5 H, a capacitance of 15μF and a resistance of 100 Ω are connected in series across 200 V 50 Hz main. Find the current in the circuit.

18. Check whether the following function is a solution to the one dimensional wave equation
    $Y = 2 \sin x \cos vt$.

19. Find the potential inside and outside a spherical shell of radius R that carries a uniform surface charge. Set the reference point at infinity.

(Ceiling 30 marks)

Section C – Essay type

Essays – Answer in about two pages.
*Any **one** question.*
The question carries 10 marks.

20. Explain how Maxwell modified Ampere's theorem. Derive Maxwell's equation in matter.

21. Briefly discuss electrostatic boundary conditions.

($1 \times 10 = 10$ marks)

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