

19U403

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Name:

Reg. No:

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2021

(CBCSS-UG)

CC19U PHY4 B04 - ELECTRODYNAMICS II

(Physics - Core Course)

(2019 Admission - Regular)

Time: Two Hours

Maximum: 60 Marks

Credit: 3

Section A (Short Answer type)

Answer *all* questions. Each question carries 2 marks.

1. Write the equation, which proves that charge density inside a conductor is zero for the steady current.
2. Write down Maxwell's equations inside matter.
3. Write down the boundary conditions for tangential components of **E** and **H**.
4. What is Poynting vector?
5. Give phasor notation of a sinusoidal wave travelling in x-direction. What is the advantage of using phasor notation?
6. What is meant by polarization of a wave?
7. Write down the relationship between E and B.
8. What is meant by logarithmic decrement?
9. What is the condition for resonance in an LCR circuit in series?
10. Define Q factor of a circuit.
11. Define the terms. a) admittance b) impedance.
12. State Norton's Theorem.

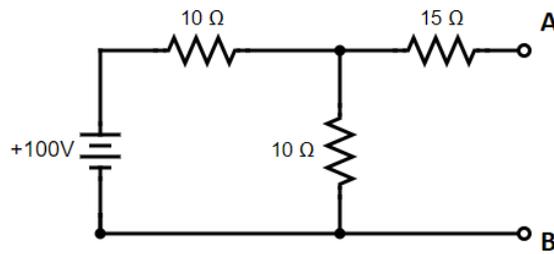
(Ceiling: 20 marks)

Section B (Paragraph/Problem type)

Answer *all* questions. Each question carries 5 marks.

13. State Faraday's law of electromagnetic induction and express it in differential form.
14. Obtain the reflection and transmission coefficients for normal incidence of an electromagnetic wave.
15. Set up the differential equation for an C-R circuit when the battery is switched off?
16. In an LCR circuit $C = 0.2\mu\text{F}$, $L = 0.05\text{H}$ and $R = 100\Omega$. Check whether it is oscillatory or not. If oscillatory, calculate the frequency of the circuit.
17. An alternating voltage of 230V and frequency 50Hz is applied to a choke coil of inductance 2H and resistance 100Ω. Find the power factor and the power absorbed.

18. Using Norton's theorem, find the constant current equivalent of the given circuit.



19. Show that electric and magnetic fields are invariant under gauge transformations.

(Ceiling: 30 Marks)

Section C (Essay type questions)

Answer any *one* question. Each question carries 10 marks.

20. Derive the Maxwell's equations both in the differential and integral form. Explain the significance of each equation.

21. Obtain the expression for the average energy and momentum of an electromagnetic wave.

(1 x 10= 10 Marks)
