**23U403** (Pages: 2) Name : .....

Reg. No : .....

**FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2025**

(CBCSS-UG)

(Regular/Supplementary/Improvement)

**CC19U PHY4 B04 / CC20U PHY4 B04 - ELECTRODYNAMICS - II**

(Physics - Core Course)

(2019 Admission onwards)

Time: 2 Hours Maximum: 60 Marks

Credit: 3

**Part A** (Short answer questions)

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

1. Write down the expression for energy stored in a maganetic field in terms of self inductance.
2. State Poynting's theorem. Write the equation.
3. Define refractive index . Give its expression.
4. What is meant by polarisaiton of a wave?
5. Write down the Maxwell's equation in a linear homogeneous medium.
6. Define relaxation time of C-R circuits.
7. A capacitor discharges through a resistor and a inductance.Set up a differential equation for the transient current in the circuit.
8. Write down the second order differential equation of a LCR circuit in series and explain the symbols.
9. Explain how LCR circuit can be used for tuning purposes.
10. Define the terms a)admittance b)impedance
11. Give an expression for time average power in AC circuits.
12. State Norton's Theorem.

**(Ceiling: 20 Marks)**

**Part B** (Short essay questions - Paragraph)

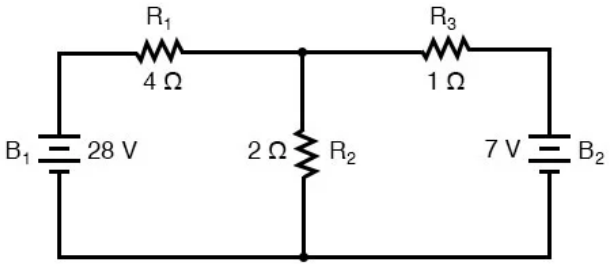
Answer ***all*** questions. Each question carries 5 marks.

13. Two long cylinders (radii a and b) are separated by material of conductivity $\mu$. If they are maintained at a potential difference V, what current flows from one to the other, in a length L?
14. How is the vector potential related to the electric field?
15. Derive the expression for energy and momentum per unit volume of an electromagnetic wave.

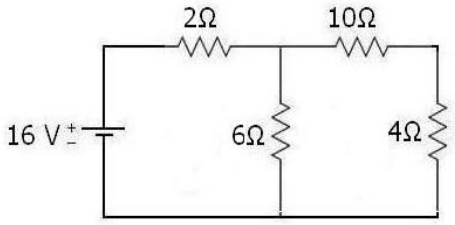
16. Write a note on scalar and vector potential. Derive expressions for electric field in terms of scalar and vector potentials.

17. Discuss the working principle of a ballistic galvanometer.

18. In the circuit shown, find the current through 2Ω resistor using Superposition theorem.




19. Solve the given circuit to find the current through 4 Ω using Thevenin's Theorem.



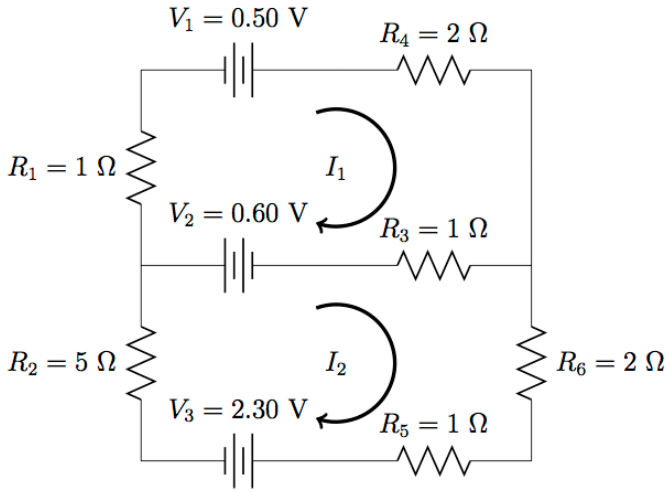

**(Ceiling: 30 Marks)**

**Part C** (Essay questions)

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

20. Obtain the expresions for reflection and transmission coefficients for an electromagnetic wave at a normal incidence.

21. Find the currents flowing in the circuit given using the Mesh Analysis Approach and Cramers rule.




**(1 × 10 = 10 Marks)**

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