20U403 (Pages: 2) Name: .....

Reg.No: .....

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2022

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U PHY4 B04 / CC20U PHY4 B04 - ELECTRODYNAMICS II

(Physics - Core Course)

(2019 Admission onwards)

Time : 2.00 Hours Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

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

1. Write the equation for maganetic energy density and explain the terms.
2. What is poynting vector?
3. What is meant by polarisaiton of a wave?
4. State Poynting theorem.
5. Give modified electromagnetic wave quation for conducting media.
6. Write a short note on potential formulation in electrodynamics.
7. Set up a differential equation for the series LCR circuit during charging.
8. Define Q factor.
9. Define the term impedance with an example.
10. Write Kirchoff's current and voltage laws.
11. How a current source can be converted to an equivalent voltage source?
12. State maximum power transfer theorem.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. Explain the growth of transient currents in R-L circuit?Graphically represent the same.
14. How is vector potential related to electric field?

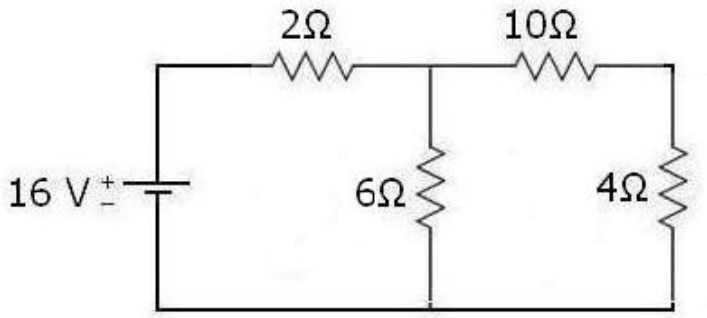
15. Derive expression for an electromagnetic wave in free space from Maxwell's equation.

16. An EMF source of 8.0 V is connected to a purely resistive electrical appliance (a light bulb). An electric current of 2.0 A flows through it. Consider the conducting wires to be resistance-free. Calculate the resistance offered by the electrical appliance.

17. Derive the expression for charge flowing through a BG.

18. Show that the resonant frequency ω_0 of an LCR series circuit is the geometric mean of ω_1 and ω_2 the lower and upper half power frequencies respectively.

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. Explain how Maxwell modified Ampere's law. Derive the Maxwell's equation inside a polarised matter.

21. Derive the expresions for reflection and transmission coefficients at normal incidence.

(1 × 10 = 10 Marks)

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