

Seat Number

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April 2017



गज - 035

PHYSICS PAPER - II : PHY-112
Electricity and Magnetism
(112102)

P. Pages : 3

Time : Two Hours

Max. Marks : 60

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and carry equal marks.
5. Figures to the right indicate full marks.
6. Draw a neat labelled diagram wherever necessary.
7. Use of logarithmic table or standard electronic calculator is allowed.
8. Symbols have their usual meanings.

1. a) Attempt **any six** of the following select the correct option and rewrite the following. 6

i) which of the following is a diamagnetic material.....

- | | |
|-----------|----------|
| a) Copper | b) Iron |
| c) Sodium | d) Water |

ii) The macroscopic form of Ohm's law is.....

- | | |
|----------------|--------------|
| a) $V = I^2 R$ | b) $V = IR$ |
| c) $V = IR^2$ | d) $V = I/R$ |

iii) The time constant of LR inductive circuit is.....

- | | |
|----------|------------|
| a) L/R | b) R/L |
| c) RC | d) $R^2 C$ |

iv) The S.I. unit of self inductance is.....

- | | |
|------------|----------|
| a) Henry | b) Weber |
| c) Maxwell | d) Tesla |

v) Practically the efficiency of transformers is.....

- | | |
|----------------|---------|
| a) Less than 1 | b) 1 |
| c) 2 | d) 100% |

- b) Attempt **any six** of the following answer in one sentence.

- i) State the Kirchhoff's voltage law.
- ii) State any four losses of transformer.
- iii) State the principle of transformer.
- iv) State the relation between turns ratio with current ratio.
- v) Define a Right circular cylinder.
- vi) What are two types of magnetic parameters.
- vii) State efficiency of dc source under maximum power transfer theorem.
- viii) Give any one application of inductive kick.

- 12

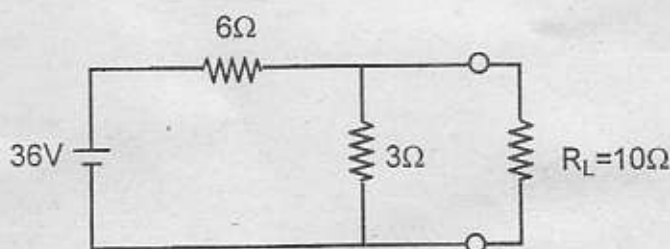
- i) State Joule's law of heating effect.
- ii) If resistivity of aluminum is $2.8 \times 10^{-8} \Omega$, then what is its conductivity.
- iii) Three inductors of 1mH, 10mH and 33mH are connected in a series connection with no mutual inductance between them. Calculate the total inductance of the series combination.
- iv) Give two examples of paramagnetic substances.
- v) Give any four applications of transformer.
- vi) Draw the curves representing growth and decay of charge in L-R circuit.
- vii) Two coils having inductances of 2H and 8H are wound on the same core giving a co-efficient of coupling of 0.9. Find mutual inductance between the two coils.
- viii) What is copper loss in transformer.
- ix) One horsepower is equal to how many watts.

3. Attempt **any four** of the following. 12

- Obtain an expression for energy stored in an inductor.
- Give the different steps to thevenize the circuit, take suitable example.
- Write note on Ferromagnetic material.
- Define turns ratio, voltage ratio and current ratio of the transformer.
- Write note on Autotransformer.
- Explain the term magnetic susceptibility.

4. Attempt **any three** of the following. 12

- Find Thevenin's equivalent circuit of a given circuit. Hence find current across the load $R_L = 10\Omega$.



- Draw a circuit representing decay of current in L-R circuit. Define time constant of L-R circuit.
- What are magnetization curves. Explain residual magnetization.
- Prove that $\bar{J} = 6\bar{K}$ where symbols are usual.
- Explain the phenomenon of self induction. Define co-efficient of self induction.

5. Attempt **any two** of the following. 12

- State and prove maximum power transfer theorem.
- Obtain an expression for growth of current in L-R circuit. Define time constant.
- Derive an expression for mutual inductance of two co-axial solenoids.
