April 2014

Seat No. | | | | | | |

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कड - 026

PHYSICS PAPER - II : PHY - 112
Electricity and Magnetism
(11126)

P. Pages : 3

Time : Two Hours **Max. Marks : 40**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same 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. Draw a neat labelled diagram wherever necessary.
6. Use of logarithmic table or standard electronic calculator is allowed.
7. Symbols have their usual meanings.

1. Attempt **any eight** of the following select the correct option. **8**

i) The S. I. unit of current is .....
   a) A/m^2 b) A/m
   c) mA/sec d) Ampere

ii) The time required to charge the condenser up to 0.632 of its final steady charge is of .....
   a) capacitive circuit b) inductive circuit
   c) resistive circuit d) none of these

iii) Magnetic susceptibility χ equals to .....
   a) dipole moment per unit volume
   b) torque per unit area
   c) magnetization per unit magnetic field intensity
   d) none of these

iv) Hysteresis loop is a plot of .....
   a) M Vs H b) B Vs H
   c) M Vs B d) both a and b

v) The S.I. unit of resistance is .....
   a) Kilo-ohm b) ohm
   c) Farad d) none of these

vi) The groups of atomic magnets formed due to interaction are called as .....
a) domains b) resistances
c) inductances d) none of these

vii) The relation between current density vector and volume charge density is known as .....
a) equation of continuity b) equation of conductivity
c) equation of relativity d) none of these

viii) The S.I. unit of inductance is .....
a) Farad b) Henry
c) Ohm d) Volt

ix) The effective inductance for two coils in series is L_S = ...
a) $L_1 + L_2$ b) $L_1 - L_2$
c) $\frac{L_1}{L_2}$ d) $L_1 \cdot L_2$

x) Principle of a transformer is .....
a) Mutual Induction b) Electromagnetic induction
c) Self induction d) none of these

2. Attempt **any four** of the following. **8**

a) State Faradays law's of electromagnetic induction.

b) Define resistance.

c) A fully charged condenser of capacity 1μF is discharged through a resistance of 2 megaohm. Calculate the time taken by the charge to full 38% of its initial value.

d) Define the terms :
i) short circuit current.
ii) open circuit voltage.

e) Draw the curves representing growth and decay of current in L-R circuit.

f) Define efficiency of transformer.

3. Attempt **any two** of the following. **8**

a) Obtain an expression for the discharge of condenser through a resistance.

b) What is coefficient of self induction ? Hence calculate the coefficient of self induction of a coil of 100 turns with air core. If a current of 2 ampere produces a magnetic flux of 0.0001 weber through the coil.

c) What are Hard Magnetic materials ? Mention their example and properties.

4. a) Attempt **any two** of the following. **6**

i) What is transformer ? Give its principle.

ii) State KCL and KVL.

iii) Draw and explain circuit diagram for growth of current in L-R circuit.

b) State any four applications of transformer. **2**

5. Attempt **any one** of the following. **8**

a) State maximum power transfer theorem and derive the necessary condition. Also obtain an expression for efficiency (x) of circuit for it.

b) Discuss paramagnetism and diamagnetism with their characteristic properties.

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