

Model Question Paper
ElectroMagnetic Induction and Alternating Current - Part III

12th Standard

Physics

Reg.No. :

--	--	--	--	--	--

I. Answer all the Questions.
II. Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 75

5 x 1 = 5

Section-A

- 1) The rms value of an ac voltage with a peak value of 311 V is
(a) 100 V (b) 220 V (c) 50 V (d) 70.7 V
- 2) The relation represents magnetic flux
(a) $\phi = B \cdot \vec{A}$ (b) $\phi = B \vec{\times} \vec{A}$ (c) $\phi = BA \sin \theta$ (d) d)(a) and (b)
- 3) Due to the relative motion between the coil and the bar magnet,
(a) The deflection is more when the magnet is moved faster, and less when the magnet is moved slowly
(b) when the magnet is moving towards (or) moving away from the coil, the momentary deflection is held in the same direction
(c) When the magnet is kept stable within the coil the deflection is zero (d) d)(a) and (b) is wrong
- 4) According to Fleming's right hand rule, the middle finger denotes the direction of
(a) motion of conductor (b) the induced current (c) Magnetic field (d) electric current
- 5) The self inductance of a long solenoid if it is filled with a medium of permeability μ'
(a) $L = \frac{\mu A^2 N}{l}$ (b) $L = \frac{\mu_0 N l^2}{A}$ (c) $L = \frac{\mu_0 N^2 l}{A}$ (d) $L = \frac{\mu N^2 A}{l}$

Section-B

- 6) Define alternating current and give its expression.
- 7) What is capacitive reactance?
- 8) What is resonant frequency in LCR circuit?
- 9) Define power factor.
- 10) Why can a d.c. ammeter not read a.c.?

5 x 3 = 15

Section-C

- 11) What are the reasons for various energy losses in a transformer? (or) Explain the various energy losses in a transformer. How are they minimised?
- 12) State Faraday's laws and Lenz's law of electromagnetic induction.
- 13) Obtain an expression for the coefficient of mutual induction of two long solenoids.
- 14) Give the applications of eddy currents.
- 15) Obtain an expression for the rms value of a.c.

5 x 5 = 25

Section-D

- 16) Describe the principle, construction and working of three-phase a.c. generator.
- 17) Explain the principle, construction and theory of a transformer. (Diagram not necessary). Define its efficiency. Mention the energy losses.
- 18) A source of alternating emf is connected to a series combination of a resistor R, an inductor L and a capacitor C. Obtain with the help of a voltage phasor diagram and impedance diagram, an expression for (i) the effective voltage (ii) the impedance (iii) the phase relationship between the current and the voltage.
- 19) a) Obtain the phase relation between current and voltage in an ac circuit with an inductor only. (Graph not necessary)

4 x 10 = 40

(OR)

- b) Explain the principle of transformer. Discuss its construction and working.
