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Reg. No. :

Code No. : 10033 E Sub. Code : SMPH 41/
AMPH 41

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023

Fourth Semester

Physics — Core

ELECTROMAGNETISM

(For those who joined in July 2017-2020)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- The direction of induced emf can be found by
 - Laplace's law
 - Lenz's law
 - Fleming's right hand rule
 - Kirchhoffs voltage law

- An inductor may store energy in
 - its electric field
 - its coils
 - its magnetic field
 - both in electric and magnetic fields
- The magnetic field around a long straight current carrying wire is
 - unsymmetrical
 - cylindrical symmetry
 - spherical symmetry
 - cubical symmetry
- Resistance can be measured with the help of
 - Wattmeters
 - Voltmeters
 - Ammeters
 - Ohmmeter and resistance bridges
- Hysteresis loss is determined from
 - B/H curve
 - H/B curve
 - BH curve
 - B²H curve

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- Poynting vector gives the
 - direction of polarization
 - rate of energy flow
 - intensity of electric field
 - intensity of magnetic field
- Velocity of plane electromagnetic wave in vacuum is given by
 - $c = \sqrt{\mu_0/\epsilon_0}$
 - $c = \sqrt{\mu_0\epsilon_0}$
 - $c = \frac{1}{\sqrt{\mu_0\epsilon_0}}$
 - $c = \sqrt{\mu/\epsilon}$
- Electromagnetic waves are transverse in nature is evident by
 - polarisation
 - interference
 - reflection
 - diffraction
- The earth inductor is an instrument for measuring the
 - magnetic elements
 - strong magnetic field
 - only horizontal component of earth's field
 - H, V and dip

- At the magnetic north pole of the earth, what is the value of the angle of dip?
 - zero
 - minimum
 - infinity
 - maximum

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

- (a) State and explain Faraday's law of electromagnetic induction.
Or
(b) Obtain an expression for coefficient of coupling between two coils.
- (a) State ampere's circuital law. Derive an expression for magnetic field inside a long solenoid.
Or
(b) With a neat diagram discuss the theory of Desauty bridge.
- (a) Define \vec{B} and \vec{H} . Establish the relation.
Or
(b) Write short notes on poynting vector.

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[P.T.O.]

14. (a) Define terms (i) Energy density and (ii) Momentum density.

Or

- (b) Discuss briefly energy and momentum of electromagnetic waves.
15. (a) Discuss the theory of Earth inductor.

Or

- (b) Write a note calibration of BG.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Describe a method of determining the mutual inductance between two coils of wire.

Or

- (b) What are eddy currents? Give their practical applications.

17. (a) Obtain an expression for magnetic field along the axis of circular coil carrying current.

Or

- (b) Give the theory and working of a moving coil Ballistic galvanometer.

18. (a) Explain what is hysteresis and describe loss of energy per cycle (hysteresis loss).

Or

- (b) Derive Maxwell equations.

19. (a) Explain electromagnetic wave propagation of reflection and transmission at normal incidence.

Or

- (b) Explain the phenomenon of polarisation by reflection.

20. (a) Explain how will you use it to determine vertical component of the earth's field.

Or

- (b) Explain the induction coil and its uses.