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Reg. No. :.....

...ode No. : 30310 E Sub. Code : SMPH 41 / AMPH 41

...c. (CBCS). DEGREE EXAMINATION, APRIL 2022.

Fourth Semester

Physics — Core

ELECTROMAGNETISM

(For those who joined in July 2017 onwards)

...me : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

The self inductance associated with a coil is independent of

(a) Current (b) Induced Voltage

(c) Time (d) Resistance of a coil

Eddy currents do not cause

(a) sparking (b) damping

(c) heating (d) loss of energy

3. Ampere's circuital law is given by

(a) $\phi \vec{H} . d \vec{l} = \mu_0 \vec{I}$ (b) $\phi \vec{B} . d \vec{l} = \mu_0 I$

(c) $\phi \vec{B} . d \vec{l} = \mu_0 J$ (d) $\phi \vec{H} . d \vec{l} = \mu_0 J$

4. The deflection θ is related to the electric current in a galvanometer by the relation

(a) $I \alpha \theta$ (b) $I \alpha \tan\theta$

(c) $I \alpha \sin\theta$ (d) $I \alpha \cos\theta$

5. The correct expression for the pointing vector is

(a) S = E x B (b) S = E x B/2

(c) S = E x B/μo (d) S = E x B/2μo

6. Electromagnetic waves are produced by

(a) A static charge

(b) An accelerated charge

(c) A moving charge

(d) Charged particle

7. The idea of displacement current is due to

(a) ampere (b) Faraday

(c) Gauss (d) Maxwell

For air the refractive index of light is ___

(a) 1 (b) 2

(c) very close to 1 (d) 0

Earth resistance in a typical domestic wiring is

(a) Less than 5 ohms (b) around 100 ohms

(c) very large (d) around 1000 ohms

Ballistic galvanometer are principally used for the measurement of

(a) current (b) voltage

(c) power (d) electric charges

PART B — (5 × 5 = 25 marks)

...nswer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

(a) Define

(i) Self inductance

(ii) Mutual inductance

Or

(b) Describe the theory of eddy currents

12. (a) State and prove ampere's circuital law

Or

(b) Derive an expression torque on a current loop at a uniform magnetic field

13. (a) Define

(i) Hysteresis

(ii) Coercivity

Or

(b) Write short notes on

(i) Displacement current

(ii) Poynting vector

14. (a) Discuss briefly energy and Momentum in electromagnetic

Or

(b) Discuss the enrgy relations of electro-magnetic waves

15. (a) Describe the measurement of horizontal component of the earth's magnetic field

Or

(b) Explain the 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) Explain the determination of self inductance by Owen's bridge

Or

(b) Explain the experimental determination of mutual inductance between a pair of coils using BG

17. (a) Explain the Biot-savart law and Ampere's law and discuss their importance in electromagnetism

Or

(b) Describe an experiment to find charge sensitivity and absolute capacity of a capacitor

18. (a) Describe the three magnetic vectors M, B, and H obtain relation between them

Or

(b) Explain Hertz experiment for production and detection of EM Waves

19. (a) Derive wave equation for Electric field and Magnetic field

Or

(b) Define term

(i) Total internal reflection and

(ii) Polarization

20. (a) Outline the uses of Earth inductor

Or

(b) Discuss briefly induction coil and uses

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