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Reg. No. :

Code No. : 20560 E Sub. Code : SMPH41

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2021.

Fourth Semester

Physics — Core

ELECTROMAGNETISM

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer.

1. The inductance of coil depends upon
 - (a) Number of turns
 - (b) Type of core
 - (c) Space
 - (d) All

2. $e = -\frac{dq}{dt}$ is
 - (a) Lens law
 - (b) Faraday's law
 - (c) Coloumb law
 - (d) None

3. The unit of magnetic induction is
- (a) w/m^2 (b) w
(c) Coloumb (d) None
 $\{w \rightarrow \text{weber}\}$
4. The relation between induction permeability and field is
- (a) $B = \mu_0 H$ (b) $H = \mu B$
(c) $HB = \mu$ (d) None
5. The value of $\nabla \cdot D$ is
- (a) δ (b) 0
(c) 1 (d) none
6. Poynting's theorem is
- (a) $\int (E \times H) \cdot \partial A = -\frac{\partial U}{\partial t}$
(b) $\int (E \times H) \cdot \partial A = \phi^2$
(c) 0
(d) 1

7. The direction of EM Wave propagation is along _____ vector.

- (a) E (b) H
(c) $\frac{1}{\mu}(\epsilon \times B)$ (d) none

8. The value of μ is

- (a) $\frac{\sin i_p}{\cos i_p}$ (b) $\sin i_p \cdot \cos i_p$
(c) $\frac{\cos i_p}{\sin i_p}$ (d) none

9. Earth inductor is used to measure

- (a) Change field
(b) Earth's magnetic field
(c) Distance
(d) None

10. The magnitude of Earth's Magnetic Field at its surface

- (a) 0.25–0.65 gauss (b) 1 gauss
(c) 0 (d) 10 gauss

PART B — ($5 \times 5 = 25$ marks)

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

Each answer should not exceed 250 words.

11. (a) Explain Faraday's law of Electromagnetic induction.

Or

- (b) Explain Mutual Inductance with its units.

12. (a) Explain flux, induction and Lorentz' force.

Or

- (b) Derive an expression to find magnetic field in solenoid.

13. (a) Define permeability and susceptibility and relate them.

Or

- (b) Explain displacement current in detail.

14. (a) Derive an expression for EM wave equation for magnetic field.

Or

- (b) Explain polarization of reflection.

15. (a) Explain in detail, the calibration of BG.

Or

- (b) Write down the uses of Induction Coils.

PART C — ($5 \times 8 = 40$ marks)

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

Each answer should not exceed 600 words.

16. (a) What is meant by coupling? Obtain an expression for coefficient of coupling between two coils.

Or

- (b) Explain the method of finding mutual inductance between two coils.

17. (a) Explain an expression for magnetic induction at a point on axis of a circular coil.

Or

- (b) Explain construction, working and uses of B.G.

18. (a) Explain displacement current, B.H. Curve and energy loss in Hysteresis.

Or

- (b) Explain Hertz experiment on E.M. waves.

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

Or

- (b) Explain in detail reflection and transmission of EM Waves.

20. (a) Explain (i) Earth inductor (ii) Horizontal component (iii) Vertical component of Earth's Magnetic Field.

Or

- (b) Explain the working of an Induction Coil.
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