(7 pages) **Reg. No. :** .....

Code No. : 41378 E **Sub. Code : SMPH 41**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2019.

Fourth Semester

Physics – Main

ELECTROMAGNETISM

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The direction of induced emf in a circuit is given by

   (a) Faraday's law

   (b) Fleming's law

   (c) Lenz's law

   (d) none of these

2. The inductance of a coil depends upon ————

   (a) Number of turns of coil

   (b) type of core

   (c) spacing between the turns

   (d) all the above

3. The intensity of Magnetization of a material is defined as

   (a) The magnetic moment per unit volume

   (b) The magnetic moment per unit area

   (c) The pole strength per unit volume

   (d) None of the above

4. Magnetic induction is expressed in units of ————

   (a) henry (b) weber/meter^2

   (c) cm (d) Am

5. Displacement current in a circuit containg capacitor across the capacitor is

   (a) Equal to the conduction current

   (b) more than the conduction current

   (c) less than the conduction current

   (d) may be more or less conduction current

6. Who discovered the concept of displacement current?

(a) Faraday (b) Maxwell

(c) Anderson (d) None of the above

7. Electromagnetic waves propagate through the medium at the speed

(a) $V = \frac{1}{\sqrt{\epsilon \mu}}$

(b) $V = \frac{\sqrt{\mu}}{\varepsilon}$

(c) $V = \sqrt{\epsilon \mu}$

(d) $V = \frac{\sqrt{E}}{\mu}$

8. Poynting vector is given by _____

(a) $S = \frac{1}{\mu_\circ}(E \times B)$

(b) $S = \frac{1}{\mu_\circ}(E.B)$

(c) $S = \mu_\circ(E \times B)$

(d) $S = \mu_\circ(E.B)$

9. Induction coil is used to

(a) Discharge of electricity

(b) to produce spectra of gases

(c) to produce x-ray

(d) All the above

10. Earth inductor is used for the measurement of _____ elements of earth

(a) Electrical

(b) Magnetic

(c) Thermal

(d) Chemical

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Describe with necessary theory, the Owen's bridge for determining the self — inductance of a coil.

Or

(b) Define Mutual induction. Describe Mutual inductance between two co — axial solenoids.

12. (a) Define Magnetic induction and Lorentz force. Define Magnetic flux.

Or

(b) Calculate the value of the torque on a current loop placed in a uniform magnetic field.

13. (a) Define Displacement current. And derive the magnitude of displacement current.

Or

(b) Define poynting vector. Obtain an expression for poynting vector.

14. (a) Explain Monochromatic plane waves travelling in an Arbitary direction.

Or

(b) State Brewster's law and explain Brewster's angle.

15. (a) Describe an earth inductor.

Or

(b) Write about the uses of induction coil.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Describe with necessary theory Rayleigh's method to determine the self inductance of a coil.

Or

(b) Describe Anderson's bridge method of determining the self inductance of a coil of wire.

17. (a) Calculate magnetic field due to an infinitely long straight wire carrying a current using Biot — Savart law

Or

(b) Calculate magnetic field due to an infinitely long straight wire carrying a current loop in a magnetic field.

18. (a) Explain the theory of energy loss due to hysteresis.

Or

(b) Obtain Maxwell's electromagnetic field equations.

19. (a) Explain about the Monochromatic plane waves in vaccum.

Or

(b) Explain in detail about the reflection and transmission at normal incidence.

20. (a) Explain how to measure the horizontal component of the earth's magnetic field.

Or

(b) Describe how you can use ballistic galvanometer.
