

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (AE/ME) (Sem.-1,2)

**ELECTROMAGNETISM**

Subject Code : BTPH/103/18

M.Code : 75357

Date of Examination : 08-05-2024

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

**SECTION-A**

**Answer Briefly :**

1. What is Faraday's cage? Discuss its application.
2. Consider a vector field  $\vec{A} = x^2\hat{i} + y^2\hat{j} + z^2\hat{k}$ , Is the field irrotational?
3. The magnetic susceptibility of a medium is  $940 \times 10^{-4}$ . Calculate its absolute and relative permeability.
4. Draw B-H curve and label it.
5. What are magnetic domains? How these changes with applied magnetic field?
6. State Poynting theorem.
7. Explain the importance of displacement current.
8. What is the need of displacement current?
9. What is Linear polarization?
10. What are uniform plane waves?

### SECTION-B

11. Obtain the expression for electric field due to a dipole.
12. Find the electric field due to a point charge at the center of dielectric sphere.
13. State and prove Bio-Savart law.
14. Obtain the expression for magnetic field due to a bar magnet.

### SECTION-C

15. a) What is electromagnetic induction? State and explain Faraday's and Lenz's law of electromagnetic induction.  
b) A coil of 100 turns is pulled in 0.04 sec between the poles of a magnet where its area includes a flux of  $40 \times 10^{-6}$  Wb. Calculate the induced e.m.f. in the coil.
16. Solve Maxwell's equation for non-conducting medium and show that amplitude of electromagnetic wave is constant.
17. Show that in a conducting medium the displacement current leads the conduction current by  $90^\circ$ .
18. Prove that a perfect conductor is a perfect reflector of electromagnetic waves.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**