

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc.(Non Medical) (2018 Batch) (Sem.-2)

**ELECTRICITY AND MAGNETISM**

Subject Code : BSNM-204-18

M.Code : 76302

Time : 3 Hrs.

Max. Marks : 50

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A****1) Write briefly :**

- a) Is it possible to have a finite electric field due to an infinite charge distribution? If so, give an example.
- b) Justify the statement that electrostatic field is a conservative field.
- c) What is dielectric breakdown?
- d) What do you mean by polarizability of any material?
- e) A current is sent through a hanging coiled spring. Why does the spring contract in length?
- f) Why two magnetic lines of forces cannot cross each other?
- g) What do you understand by ferromagnetic materials?
- h) Is Lenz's law an independent law or contained in Faraday's law?
- i) Does an inductor store energy? If so, what kind of energy is it?
- j) What do you mean by displacement current?

**SECTION-B**

2. Find the expression for electric field at a point due to uniformly charged spherical shell.
3. State and prove Biot-Savart's law.
4. State and prove Faraday's law of electromagnetic induction.
5. State and explain the phenomenon of mutual induction. Define the coefficient of mutual induction.
6. A sample of helium gas is subjected to an electric field of 6000 volts/cm. Find :
  - a) polarization produced in the sample
  - b) the separation between the centres of gravity of positive and negative charges in the helium atom. Given that atomic polarizability is  $0.18 \times 10^{-40}$  farad  $\text{m}^2$  and number of helium atoms per unit volume is  $2.6 \times 10^{25}$  atoms/ $\text{m}^3$ .

**SECTION-C**

7. State and derive Gauss's theorem in dielectrics. Also discuss its applications.
8. What do you understand by magnetic susceptibility and magnetic permeability? Derive the relation of these with magnetisation (M), magnetic field intensity (H), and magnetic field induction (B).
9. Discuss the inadequacy in the Ampere's law as observed by Maxwell. How Maxwell modified the Ampere's law?

**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.**