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

Date of Examination : 12-07-22

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) Explain the meaning of 'electric flux'. What are its S.I. units?

(b) What is an electric dipole?

(c) Can two equipotential surfaces intersect?

(d) Differentiate between Paramagnetic and Ferromagnetic materials.

(e) Can a free electron have a magnetic moment?

(f) Define magnetic flux. Give the units in which it is measured.

(g) State and explain Lenz's law.

(h) Write Maxwell's equations in electromagnetic theory.

(i) Explain the term 'displacement current'.

(j) Define Poynting vector for electromagnetic waves.

SECTION-B

2. Apply Gauss's theorem to calculate the electric field due to an infinite sheet charge.

3. A parallel plate capacitor has air between its two plates which are of area 'A' each and separated by distance 'd'. Calculate the change in its capacity if a very thin metallic sheet of area 'A' is introduced between the plates.

4. Derive an expression for the coefficient of self induction for a current loop.

5. What is mutual induction? Define coefficient of mutual induction between two coils. Give the units in which it is measured.

6. Show that the energy flux for a travelling electromagnetic wave in free space is simply the energy density times the velocity of the wave.

SECTION-C

7. Using Gauss's theorem, calculate the electric field due to a uniformly charged spherical shell at a point (a) outside the shell and (c) inside the shell. Hence, show that for points lying external to it a uniformly charged spherical shell behaves as if the entire charge were concentrated at the centre and for point lying inside it, the electric field is zero. Show graphically the variation of electric field with distance from the centre of the shell.

8. Use Biot and Savart's law to find an expression for magnetic field at a point on the axis of a current carrying solenoid. Hence, prove that the magnetic field at the end is half the magnetic field at the centre of a very long solenoid.

9. Derive the general wave equations for electric vector and magnetic vector for electromagnetic waves in vacuum. What important conclusions can you draw from it?

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.