

| Roll No. | | | | | Total No. of Pages: 02 |
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Total No. of Questions: 11

B.Sc. (Honours) Chemistry (Sem.-1)
ELECTRICITY AND MAGNETISM

Subject Code: UC-BSHP-112-19 M.Code: 77225

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

- SECTION-A is COMPULSORY consisting of EIGHT questions carrying TWO marks each.
- 2. SECTION-B contains EIGHT questions carrying FOUR marks each and students have to attempt any SIX questions.
- 3. SECTION-C will comprise of two compulsory questions with internal choice in both these questions. Each question carries TEN marks.

SECTION-A

1. Write briefly:

- a) What are scalar and vector fields? Give one example of each.
- b) Find a unit normal to the surface $x^2y + 2xz = 4$ at (2, -2, 3).
- c) Why two electric lines of force do not cross each other?
- d) What is the work done in moving a charge 2C on the equipotential surface?
- e) What is the force experienced by a stationary charge in an electric field and a magnetic field?
- f) State the two boundary conditions for magnetostatics.
- g) An electromagnetic wave in free space has a maximum electric field of 1000 V/m. what is the maximum value of magnetic field?
- h) Define Poynting vector for electromagnetic waves.

SECTION-B

- 2. Describe gradient of a scalar field. Explain its physical significance.
- 3. Define Curl of a vector field and give its physical significance.
- 4. Define Gauss law and State it's applications.

1 M-77225 (S111)-2463



- 5. A capacitor consists of two metallic discs each of 1 metre in diameter placed parallel to each other at a distance of 4mm. the potential difference between the plates is 10000 volts. Calculate the energy stored by the capacitor.
- 6. A wire of square shape of each side 10 cm long is carrying current of 2A in the anticlockwise direction. Calculate the magnetic field at its centre.
- 7. Using Ampere's law calculates the magnetic field at a point inside a long current carrying solenoid.
- 8. Distinguish between conduction and displacement current.
- 9. Write four Maxwell's equation in differential and integral form.

SECTION-C

10. State and derive Gauss divergence theorem. Give its importance.

OR

What made Maxwell suggest the presence of displacement current?

11. Write Maxwell's equations of electromagnetic theory and hence derive general wave equation for electric vector and magnetic vector for electromagnetic waves in free space.

OR

Apply Gauss law to calculate the electric field due to an infinite line charge.

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.

2 M-77225 (S111)-2463