

Enrollment No:-_____

Exam Seat No:-_____

C.U.SHAH UNIVERSITY

Summer-2015

Subject Code: 4SC03PHC2

Subject Name: Electricity and Magnetism

Course Name: B.Sc. (Pure)

Date: 8/5/2015

Semester: III

Marks : 70

Time: 02:30 TO 05:30

Instructions:

- 1) Attempt all Questions of both sections in same answer book/Supplementary.
- 2) Use of Programmable calculator & any other electronic instrument prohibited.
- 3) Instructions written on main answer book are strictly to be obeyed.
- 4) Draw neat diagrams & figures (if necessary) at right places.
- 5) Assume suitable & perfect data if needed.

SECTION-I

Q-1 All Questions are compulsory

7

1. What is unit of electric field.
2. Define the electric potential.
3. What is unit of permittivity?
4. Draw the electric field line of electric dipole.
5. What is the unit of electric dipole moment?
6. Give the statement of Coulomb's law.
7. Find the force between two charges each of $1\mu\text{C}$, when they are placed 2 cm apart in air.

Q-2 Answer the following in detail.

1. Derive the electric potential due to electric dipole with figure. 5
2. Derive the Gauss's law in differential form. 5
3. Determine electric field and electric potential at 4 cm away from a charge of $4\mu\text{C}$. 4

OR

1. Obtain the electric field due to long charged straight wire. 5
2. Derive the formula for capacitance of parallel plate capacitor 5
3. Obtain the electric field intensity required to just support an ion of mass 10^{-4} gram having 1.432 coulomb electric charges in the air. 4

Q-3 Answer the following in detail.

1. Obtain the potential due to point charged. 5
2. Derive the formula of potential energy store in capacitor. 5
3. The electric potential due to an isolated point charge at a point 20 cm away from that charge is 400 volt. Compute the magnitude of that electric charge. 4

OR

1. Explain electric flux with necessary figure in detail. 5

Page 1 of 2



C. U. SHAH UNIVERSITY

(Established under Gujarat Private Universities (Amendment) Act 18 of 2009)

Sponsored By : VARDHAMAN BHARTI TRUST

8-5

2. Write a short note on parallel plate capacitor. 5
3. Explain the line integral of electric charges. 4

SECTION-II

Q-4 Attempt the following. 7

1. What is the unit of magnetic permeability?
2. Define the solenoid.
3. What is the unit of magnetic field in CGS and SI system?
4. Give any two names of paramagnetic materials.
5. Define the self-inductance of coils.
6. What is the unit of Magnetic Moment?
7. If relative permeability of a medium is 0.075, calculate its magnetic susceptibility.

Q-5 Answer the following in detail.

1. Explain the paramagnetic materials with properties. 5
2. Explain domain and Bloch wall theory in ferromagnetic materials. 5
3. A 25 cm long air cored solenoid having 3 cm² cross sectional area has 500 turns. Calculate its self-inductance in Henry. 4

OR

1. What is mutual inductance? Derive the formula of induced emf in two coils. 5
2. What are ferromagnetic materials? Write about their properties. 5
3. What is Bohr Magneton? Derive its value and unit. 4

Q-6 Answer the following in detail.

1. Explain: Hysteresis Loop of $B \rightarrow H$ curve with each part of its. 7
2. What is Hall effect? Derive formula for Hall Electric field, Hall voltage, Hall coefficient R_H and Hall mobility. 7

OR

1. Obtain the relation between magnetic flux density (B), magnetic field (H), magnetic susceptibility (χ) and relative magnetic permeability (μ_r) 5
2. Write a short note on Magnetic field lines. Draw figures. 5
3. A magnetic material is placed under a magnetic field strength of 500 A/m. If the magnetic susceptibility of the material is 1.23; calculate the magnetic flux density inside the material. 4

