Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Electricity and Magnetism

Subject Code: 4SC03PHC2 Branch: B.Sc. (Physics)

Semester: 3 Date: 10/12/2018 Time: 02:30 To 05:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) What does Magnetic Susceptibility of a material refer to?
b) Define: Electric dipole
c) Differentiate between electric and magnetic flux?
d) What is the main reason for hysteresis loss in magnetic materials?
e) What does permittivity of a medium say about?
f) Define Capacity of a condenser.
g) Write Gauss' law in differential form.
h) Give the relation between electric field strength and electric potential.
i) What is Curie Temperature in ferromagnetics?
j) Differentiate: Retentivity and Coercivity
k) Give two applications of Gauss' law.
l) Give expression for potential energy of a capacitor.
m) Draw and label the hysteresis loop traced for ferromagnetics.
n) Comment on the Electric Field and Electric Potential value inside a Charged Sphere.

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

a) Obtain the expression for potential of an electric dipole with suitable figure. **8**
b) Explain on magnetic field due to a solenoid. **6**

Q-3 Attempt all questions (14)

a) Give the mathematical proof for Gauss' law in electricity with necessary figure. **7**
b) Derive a general expression for capacity of a parallel plate condenser. **7**

Q-4 Attempt all questions (14)

a) Elucidate the term Magnetic Permeability and establish the relation: $\mu_r = 1 + \chi_m$ **7**
b) Discuss how Hall effect is useful in characterizing semiconductor materials? **7**

Q-5 Attempt all questions (14)

a) Deduce the expression for electric field due to a uniformly charged ring. **8**

	b)	Explain in detail Ferro magnetic materials.	**6**
Q-6		**Attempt all questions**	**(14)**
	a)	Differentiate between Self and Mutual Inductance, derive $M=\sqrt{(L_1L_2)}$, where M is mutual inductance, L_1 and L_2 are self-inductances of two coils.	**8**
	b)	'Magnetic Susceptibility, a parameter that characterizes magnetic material'. Comment on the statement.	**6**
Q-7		**Attempt all questions**	**(14)**
	a)	Derive Gauss Law in differential form.	**6**
	b)	Compare the properties of Para and Dia magnetic materials.	**8**
Q-8		**Attempt all questions**	**(14)**
	a)	Enumerate on the energy loss due to hysteresis in magnetic materials	**7**
	b)	Substantiate: Electrostatic field is conserved in nature.	**7**