C. U. SHAH UNIVERSITY
Summer Examination-2019

Subject Name: Electricity and Magnetism
Subject Code: 4SC03ELM1   **Branch: B.Sc. (All)**
Semester: 3   **Date: 25/03/2019**   **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)	Define electric flux.	01
b)	What is dielectric constant?	01
c)	Name the unit of linear charge density.	01
d)	What is the unit of permittivity?	01
e)	What is meant by the permittivity of a medium?	01
f)	How is the velocity of light is related to permittivity and permeability?	01
g)	Why electromagnets are produced using soft iron material?	01
h)	In which form is the amount of work done in charging stored in a conductor?	01
i)	Which kind of magnetic material is used for the permanent magnets?	01
j)	Define Curie temperature in Ferromagnetic materials.	01
k)	What is the formula for the electric field due to plane charged sheet?	01
l)	Name different types magnetic materials.	01
m)	What is the unit of the magnetic pole strength?	01
n)	What is the unit of capacitance?	01

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

Q-2		**Attempt all questions**	**(14)**
	A	Give the mathematical proof for Gauss' law in electricity with necessary figure.	**07**
	B	Derive the formula relating to potential difference and electric field intensity.	**07**
Q-3		**Attempt all questions**	**(14)**
	A	Explain and obtain formulae for the potentials inside and outside of the charged solid sphere.	**06**
	B	Discuss in detail the applications of Gauss theorem.	**08**
Q-4		**Attempt all questions**	**(14)**
	A	What is Ampere's Circuital law? Apply it to find **B** for a solenoid carrying electric current.	**07**
	B	Explain Magnetic Permeability and Susceptibility. Derive the relation between them.	**07**

Q-5		**Attempt all questions**	**(14)**
	A	Discuss Biot-Savart's law. Apply Bio-Savart law for a current carrying straight conductor.	**06**
	B	Compare Diamagnetic, Paramagnetic and Ferromagnetic materials	**08**
Q-6		**Attempt all questions**	**(14)**
	A	Describe Hall effect in detail with proper figure and derive necessary formula for Hall voltage and Hall coefficient.	**07**
	B	Write a detailed note on hysteresis loop and energy loss due to hysteresis.	**07**
Q-7		**Attempt all questions**	**(14)**
	A	Write Maxwellian equations and explain any one of them.	**07**
	B	Explain: Electromagnetic wave propagation through vacuum and isotropic dielectric medium.	**07**
Q-8		**Attempt all questions**	**(14)**
	A	Write a detailed note: Poynting's Vector.	**05**
	B	Discuss: Energy density in EM Field.	**04**
	C	Explain briefly Polarization of EM waves.	**05**