Roll No. .....

91528

B. Sc. 2nd Semester Physics (Hons.)

(New Scheme)

Examination – May, 2016

MAGNETISM

Paper : Phy-203

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting at least *two* question from each Unit. All questions carry equal marks.

UNIT – I

1. (a) Prove that the force acting on a test charge q_0 moving with a velocity V in a magnetic field of uniform flux density B is $q_0(\vec{V}\times\vec{B})$. How does it lead to the definition of $\vec{B}$? 4

   (b) State and explain Ampere's circuital law. 4

2. (a) Explain the term Vector Potential. Using the concept of vector potential deduce Biot-Savart's law. 4

(b) Show that energy stored in a magnetic field per unit volume is $\frac{B^2}{2\mu_0}$ 4

3. Explain the terms :

Magnetic induction, intensity of Magnetization, magnetic permeability, magnetic intensity and magnetic susceptibility also find relation between them. 8

4. Discuss domain theory of ferromagnetism. Show that energy lost per unit volume per cycle of magnetization is equal to the area of hysteresis loop. Discuss its application in selecting materials. 8

UNIT – II

5. Explain the properties of magnetic Induction $\vec{B}$ 8

(i) $\nabla \times \vec{B} = \mu_0 \vec{J}$

(ii) $\oint \vec{B}, \vec{dl} = \mu_0 I$

(iii) $\nabla, \vec{B} = 0$

6. (a) Write Faraday's laws of electromagnetic induction. 2

(b) If a conducting loop moves through a Non-Uniform magnetic field then show that e.m.f. induced in the loop is equal to negative of the rate of change magnetic flux linked with the loop. 6

7. (a) What is self induction ? Derive an expression for the self inductance of a long solenoid. 6

(b) A coil has inductance of 0.02 Henry calculate the e.m.f. induced when current in the coil changes at the rate of ISO AS^{-1}. 2

8. (a) State and explain Reciprocity theorem of mutual inductance. 6

(b) Prove that curl $E = -\frac{\partial B}{\partial t}$ 2
