14.21 QUESTIONS FROM PAST PAPERS:

Definitions:

Q.1 State the following Laws:

(i) Ampere's Law **(ii)** Lenz's Law **(iii)** Biot and Savart's Law **(2007)**

Q.2 Define:

(i) Ampere's Circuital Law **(ii)** Coulomb's Law **(iii)** Electromotive Force **(2003 P.E)**

Magnetic Force and Magnetic Flux:

Q.3 Derive an expression for the force on a current carrying conductor in a uniform magnetic field. **(2011, 2013)**

Q.4 Prove mathematically that the radius of circular path for a charge moving in a magnetic filed is given as $r = \frac{mv\sin\theta}{qB}$ where all the symbols have their usual meanings. **(2010)**

Q.5 Derive an expression for the force on a straight conductor of length "L" and an area of cross-section "A" when it is subjected to a magnetic field "B" at an angle θ. **(2011, 2008, 2006, 2004)**

Q.6 Define Magnetic Field. Derive the relation for the magnitude of Magnetic field of Induction B. Give its units. **(2004)**

Q.7 Differentiate between magnetic flux and magnetic flux density. **(2001)**

Torque on Current Carrying Conductor:

Q.8 Derive the equation for the couple of torque acting on current carrying rectangular coil suspended in a uniform magnetic field. **(2009,2005,2003P.M)**

Charge by Mass (e/m) Ratio of Electron:

Q.9 Describe a method for determining the ratio of charge to mass (e/m) of an electron. Derive the relevant mathematical expressions. **(2012,2009,2005,2003P.E 2001)**

Ampere's Law and its Applications:

Q.10 State Ampere's Circuital Law. Apply it to determine the magnetic induction (B) in a solenoid due to current in it. **(2009,2006,2002 P.M, 2002 P.M)**

Q.11 State Ampere's Law. Derive an expression for the magnetic strength B of a toroid. **(2008)**

Electromagnetic Induction:

Q.12 Describe the phenomenon of Self-induction and define Self-inductance of a coil. Give its unit. **(2009)**

Q.13 State Faraday's Law of Electromagnetic induction. Explain phenomenon of Mutual induction or self induction. Give its unit **(2012,2009,2004,2001)**

Q.14 What is Induced e.m.f.? State the Faraday's Law and Lenz's Law of electromagnetic Induction. **(2002 P.E)**

Motional EMF:

Q.15 What is a motional e.m.f.? Derive an expression for it. **(2001,2003P.M)**

Generators:

Q.16 What is the difference between magneto and A.C. generator? What is meant by the frequency of alternating current? **(2010)**

Q.17 Draw a labeled diagram of an A.C. generator and derive expression for the alternating voltage produced. (Working is not required) **(2009, 2004)**

Transformer:

Q.18 Describe with a neat diagram the construction and working of transformer. Give the relevant expression. **(2011,2008,2003P.E, 2002P.M)**

Q.19 What is a Transformer? On what principle does it work? What is the difference between a step-up and a step-down transformer? Why is a soft iron core used in a transformer? **(2005)**