

CHAPTER NO. 14
ELECTROMAGNETISM

1. Encircle the correct answers.

- i. The dimensions of magnetic flux are:
- $M^1L^{-2}T^1A^1$
 - $MLT^{-2}A^{-1}$
 - $ML^2T^2A^{-1}$
 - $ML^2T^{-2}A^{-1}$
- ii. The unit of magnetic induction \vec{B} is:
- Coulomb
 - Ampere
 - Coulomb/ampere
 - Weber/m+
- iii. The magnetic field is uniform and stronger:
- Outside the solenoid
 - Inside the solenoid
 - At the central part of the solenoid
 - None of these
- iv. The permeability of free space is measured in:
- Wb A/m
 - Am/wb
 - Wb/Ab
 - m/wbA
- v. if a electron is projected in a magnetic field with velocity V, it will experience a force:
- $\vec{F} = e(\vec{B} \times \vec{V})$
 - $\vec{F} = e(\vec{V} \times \vec{B})$
 - $\vec{F} = \vec{V}(e \times \vec{B})$
 - $\vec{F} = e(\vec{V} \cdot \vec{B})$
- vi. Lorentz force means the force acting on a particle, which is:
- Magnetic force only
 - Electric force only
 - Sum of electric and magnetic force
 - None of these
- vii. Ampere's circuital law is $\sum_{i=1}^N (\vec{B} \cdot \vec{L})i =$
- $\mu_0 I$
 - $\mu_0 A$
 - $\mu_0 B$
 - None of the above
- viii. CRO works by deflecting the beam of electron as they pass through:
- Uniform magnetic field
 - Uniform electric field between tow sets of parallel plates
 - Non-uniform magnetic field
 - None of these
- ix. In CRO, the output waveform of time base generator is:
- Circular
 - Square
 - Sinusoidal
 - Saw-toothed
- x. The acceleration of an electron of mass m and charge e, moving with uniform speed v at right angles to a magnetic field of flux density B, it given by:
- $\frac{Bev}{m}$
 - $\frac{Be}{m}$
 - $\frac{Bv}{m}$
 - Bevm

Q.2 Write the short answers.

- Why does the picture on a TV screen become distorted when a magnet is brought near the screen?
- Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate? Explain.
- How can you use a magnetic field to separate isotopes of chemical element?
- What should be the orientation of a current carrying coil in a magnetic field so that torque acting upon the coils is (a) maximum (b) minimum?
- Why the resistance of an ammeter should be very low?
- Why the voltmeter should have a very high resistance?
- Write uses of CRO.
- How Galvanometer can be made sensitive?

Note: Long questions:

Q.3 (a) State and explain Ampere's law, also calculate the field due to current carrying solenoid.

(b) Find the value of the magnetic field that will cause a maximum force of 7.0×10^{-3} N on a 20.0 cm straight wire carrying a current of 10.0 A.

Q.4 (a) Calculate the force on a moving charge in a magnetic field.

(b) What current should pass through a solenoid that is 0.5 m long with 10,000turns of copper wire so that it will have a magnetic field of 0.4T?