## INTERNATIONAL INDIAN SCHOOL BURAIDAH

Worksheet for the Academic Year 2023-24

CLASS:\_12 SUBJECT: PHYSICS DATE:13-5-2023

LESSON :\_MOVING CHARGES AND MAGNETIC FIELDS

- 1. What is the direction of the force acting on a charged particle q, moving with a velocity  $v \rightarrow$  in a uniform magnetic field B?
- 2. Why should the spring/suspension wire in a moving coil galvanometer have low torsional constant?
- 3. An ammeter of resistance 0.6  $\Omega$  can measure current upto 1.0 A. Calculate

(i) The shunt resistance required to enable the ammeter to measure current upto 5.0 A

(ii) The combined resistance of the ammeter and the shunt.

- 4. Write the expression, in a vector form, for the Lorentz magnetic force F→ due to a charge moving with velocity V→ in a magnetic field B→. What is the direction of the magnetic force?
- 5. Using the concept of force between two infinitely long parallel current carrying conductors, define one ampere of current.
- 6. Write the condition under which an electron will move undeflected in the presence of crossed electric and magnetic fields.
- 7. A steady current  $(I_1)$  flows through a long straight wire. Another wire carrying steady current  $(I_2)$  in the same direction is kept close and parallel to the first wire. Show with the help of a diagram how the magnetic field due to the current  $I_1$  exerts a magnetic force on the second wire. Write the expression for this force.
- 8. A particle of mass  $2 \times 10^{-3}$  kg and charge  $2 \mu$ C enters into a uniform electric field of  $5 \times 10^5$  NC<sup>-1</sup>, moving with a velocity of 10 ms<sup>-1</sup> in a direction opposite to that of the field. Calculate the distance it would travel before coming to rest.

- 9. A particle of mass  $5 \times 10^{-3}$  kg and charge 4 µC enters into a uniform electric field of  $2 \times 10^5$  NC<sup>-1</sup>, moving with a velocity of 30 ms<sup>-1</sup> in a direction opposite to that of the field. Calculate the distance it would travel before coming to rest.
- 10. An ammeter of resistance 0.80  $\Omega$  can measure current upto 1.0 A.

(i) What must be the value of shunt resistance to enable the ammeter to measure current upto 5.0A?

(ii) What is the combined resistance of the ammeter and the shunt?