Answer on Question #73955-Physics-Other

1. Can a charged particle move through a uniform magnetic field without experiencing any force? Explain.

Answer

Yes, but only if they are moving in or opposite to the direction of the magnetic field. In effect only the component of the magnetic field perpendicular to the velocity of an electrically charged particle acts to produce magnetic forces on the particle.

2. If no work can be done on a charged particle by the magnetic field, how can the motion of the particle be influenced by the presence of a field?

Answer

Magnetic field can change the trajectory of the particle.

3. Suppose a charged particle is moving under the influence of both electric and magnetic fields. How can the effect of the two fields on the motion of the particle be distinguished?

Answer

Magnetic field can change the trajectory of the particle. Electric field change the velocity of the particle (magnitude and direction).

4. What type of magnetic field can exert a force on a magnetic dipole? Is the force repulsive or attractive?

Answer

If by force you include torque, which causes rotation but not linear motion, then any magnetic field suffices. However, for a force able to generate linear acceleration and motion, then the field must have a gradient, in other words, the field must vary in strength with position.

5. If a compass needle is placed in a uniform magnetic field, is there a net magnetic force acting on the needle? Is there a net torque?

Answer

The net magnetic force acting on the needle force is zero, but not the net torque.