**Worksheet 8.2 - Magnetic Forces on Wires and Charges**

1. A particle carrying a charge of 0.50 μC enters a magnetic field of strength 0.045 T, with a velocity of 350 m/s. The velocity is perpendicular to the magnetic field. What is the magnetic force acting on the charged particle?
2. A segment of conducting wire 5.0 cm long carrying 5.0 A of current is perpendicular to a magnetic field of 12 T. What magnetic force acts on the segment?
3. A wire is 0.75 m long carries a current of 10.0 A is at a right angle to a uniform magnetic field. The force on the wire is 0.50 N. What is the strength of the magnetic field
4. What is the magnitude of force on a wire that is 30 cm long and positioned at a right angle to a 0.40 T uniform magnetic field? The current through the wire is 5.0 A.
5. A half-kilometre length of wire is positioned perpendicular to a 0.40 T magnetic field. What is the current carried in the wire if a force of 2.0 N acts on the wire?
6. What magnetic field strength is needed to exert a force of 1.0 x 10—15 N on an electron traveling 2.0 x 107 m/s?
7. A solenoid 0.20 m long has 600 turns of wire. What current must be passed through the solenoid to produce a magnetic field of 2.0 x 10-2 T?
8. A magnetic resonance imaging machine (MRI) is used to take medical diagnostic images of the body. To create these images, a large solenoid is used and the person is placed in the centre of the solenoid. A current of 1500 A is carried through a 2.00 m long solenoid that has 2500 loops. What is the magnetic field strength inside the solenoid?
9. A 61 mg mass just balanced the balance arm of a current balance when the strip current is 3.0 A. If the strip is 2.2 cm long, what is the magnetic field strength inside the solenoid in which the current balance is located?

**Answers:**

1. 7.9 x 10-6 N
2. 3.0 N
3. 0.0067 T
4. 0.60 N
5. 0.01 A
6. 3.1 x 10-6 T
7. 5.3 A
8. 2.36 T
9. 9.1 x 10-3 T