

Magnetic Fields Quiz from GAVS

2. What is the magnitude of the magnetic field at a distance of 1.3 meters from a wire carrying a current of 90 A?

4. A solenoid that is 1.6 m long is wound with 3000 turns of wire that carries 1.8 A of current. What is B inside the solenoid?

6. A proton and an alpha particle travel perpendicular to the same magnetic field. They have the same momentum. The charge on the alpha particle is twice that of the proton and its mass is four times as great. If the radius of the proton's path is R, what is the radius of the alpha particle's path?

8. A cyclotron that accelerates alpha particles uses a magnetic field with $B=1.15$ T and operates at a frequency of 8.77 MHz. What is the kinetic energy of an alpha particle whose orbit has a radius of 50 cm?

10. What is the maximum energy of protons accelerating in a cyclotron that has a 26 cm diameter and a magnetic field strength of 3 T?

12. A long straight wire carries a current of 5 A. An alpha particle is moving parallel to the wire at a distance of 4 cm. The speed of the alpha particle is 500 m/s. What is the magnitude of the magnetic force acting on the particle from the current in the wire? The mass of an alpha particle is 6.68×10^{-27} kg and its charge is 3.2×10^{-19} C.