

H6 Circular Paths of Particles in Magnetic Fields

6/8

H6.1 Complete the questions in the table:

B / T	q / C	$v / \text{m s}^{-1}$	m / kg	r / m
0.63	1.6×10^{-19}	3.0×10^7	9.1×10^{-31}	(a)
0.63	1.6×10^{-19}	6.4×10^6	1.7×10^{-27}	(b)
2.30	3.2×10^{-19}	8.8×10^7	(c)	0.80
0.0045	1.6×10^{-19}	(d)	9.1×10^{-31}	0.12

H6.2 In a demonstration, electrons with 200 eV of kinetic energy are going round in a 12 cm **diameter** circle. Calculate the magnetic flux density.

H6.3 In a demonstration, electrons are going round in a 12 cm diameter helix with the beam at 70° to the 0.0032 T magnetic field. Calculate the speed of the electrons.

H6.4 a) Work out the momentum of a muon (same charge as an electron, but mass = $207 \times$ electron mass) taking a curved path with a 90 cm radius perpendicular to a 0.0076 T magnetic field.

b) Work out the momentum of an electron which would take the same path in the same field.