H6 Circular Paths of Particles in Magnetic Fields

$^{6}/_{8}$

H6.1 Complete the questions in the table:

B /T	q /C	v /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× 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.

H7 Magnetic Flux and Faraday's Law

$^{9}/_{12}$

H7.1 Complete the questions in the table:

Magnetic flux density /T	Area of coil	Angle between plane of coil and magnetic field lines /°	Number of turns	Magnetic flux linkage /Wb turns
2.0	2.0 m × 1.0 m	90	40	(a)
0.00232	5.0 cm × 5.0 cm	60	2400	(b)