12 A particle with charge Q and momentum p follows a circular path of radius r. The path is at right angles to a magnetic field of magnetic flux density B.

(a) Derive the following equation for the particle.

$$r = \frac{p}{BQ}$$

(2)

(b) The particle is an alpha particle of energy 5.4 MeV.

Calculate B.

mass of alpha particle = 6.64×10^{-27} kg
$r = 0.096$ m

(4)

$B =$ .....

(Total for Question 12 = 6 marks)