Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

Question Number	Answer		Mark
	At **X** the idea that 2 particles are produced	(1)	
	One is uncharged/neutral so no track	(1)	
	charged particle has same charge as incident particle to conserve charge **Or** path of (new) charged particle changes to conserve momentum	(1)	
	At **Y** Neutral particle decays into two charged particles.	(1)	
	Tracks curve in opposite directions as particles oppositely charged. **Or** particles have (equal and) opposite charge to conserve charge **Or** particles have equal (magnitude of) momenta since their (radius of) curvature is the same.	(1)	5

Q2.

Question Number	Answer		Mark
(a)	Only (moving) charged particles are deflected by a magnetic field **Or** Only charged particles can be accelerated to produce a beam	(1) (1)	1
(b)	Into the page	(1)	1
(c)	Use of $F = mv^2/r$ **Or** use of $r = p/BQ$ Use of $F = Bqv$ **Or** use of $p = mv$ $m = 6.64 \times 10^{-26}$ kg Example of calculation $mv^2/r = Bqv$ $m = Bqr/v = (0.673\ \text{T} \times 1.6 \times 10^{-19}\ \text{C} \times 7.40 \times 10^{-2}\ \text{m}) / 1.20 \times 10^{5}\ \text{m s}^{-1}$ $m = 6.64 \times 10^{-26}$ kg	(1) (1) (1)	3
(d)	Semicircle drawn starting from same initial point and a smaller radius	(1)	1
	Total for question		6

Q3.

Question Number	Answer	Mark
(a)	The idea that electron(s) have been removed/added from an atom/molecule/particle. (1)	1
(b)	Flemings left hand (rule) **Or** FLHR (1)	1
(c)	**Max 5** Only charged particles leave a trail so photon is neutral (1) **Or** the two particles produced are charged because they leave a track Particles are oppositely charged because they curve/spiral in opposite directions (1) **Or** Particles are oppositely charged to conserve charge (1) (Applying FLHR) , top particle is positive and bottom one negative. (1) Because they have the same curvature/radius on the spirals **Or** because the paths have identical shape (1) Particles have the same momentum (1) The photon enters from the left because the (resultant) momentum afterwards is to the right.	5
	Total for question	7