## Section A

Answer **all** the questions in the spaces provided.

**1** **(a)** A table-tennis ball, initially at rest, falls through air from the top of a tall building.

On the axes of Fig. 1.1, sketch a graph to show the variation with time $t$ of the distance $d$ fallen by the ball. The ball is released at time $t = 0$.


**Fig. 1.1**

[2]

**(b)** A particle P having mass $m$, charge $+q$ and speed $v$ passes through a region of uniform magnetic flux density, as shown in Fig. 1.2.

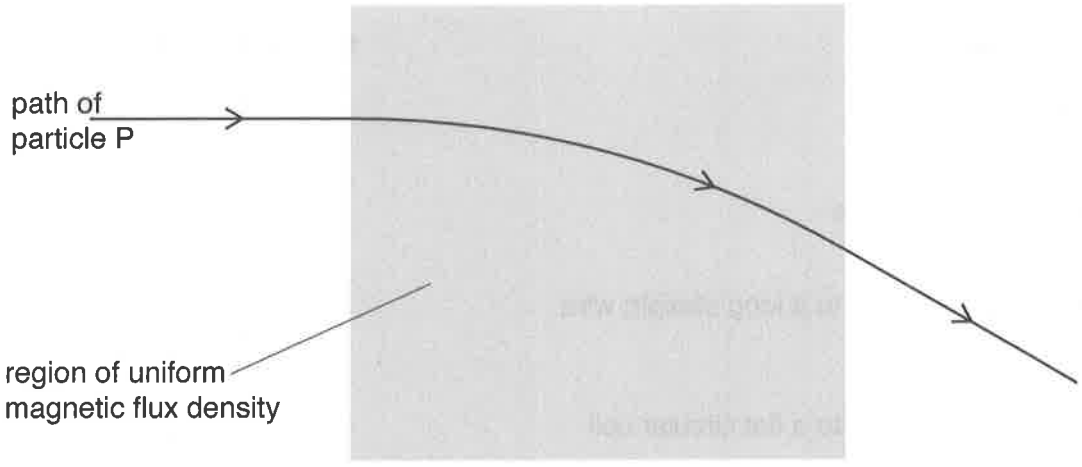


**Fig. 1.2**

A second particle S has mass $m$, charge $+q$ and speed $2v$. This particle enters the region of uniform magnetic flux density along the same path as particle P.

On Fig. 1.2, sketch the path of particle S passing through and beyond the region of the magnetic field. [2]

**(c)** An α-particle is approaching a stationary gold nucleus.
The α-particle is deviated through an angle of approximately 45° as it passes the gold nucleus.

On Fig. 1.3, sketch the path of the α-particle as it passes the gold nucleus.


**Fig. 1.3**

[2]

[Total: 6]