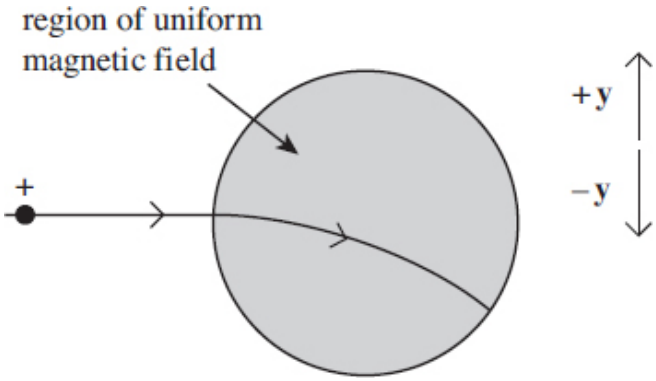
Q1. A beam of positive ions enters a region of uniform magnetic field, causing the beam to change direction as shown in the diagram.



What is the direction of the magnetic field?

A out of the page and perpendicular to it

B into the page and perpendicular to it

C in the direction indicated by $+y$

D in the direction indicated by $-y$

(Total 1 mark)

Q2. A negatively charged particle moves at right angles to a uniform magnetic field. The magnetic force on the particle acts

A in the direction of the field.

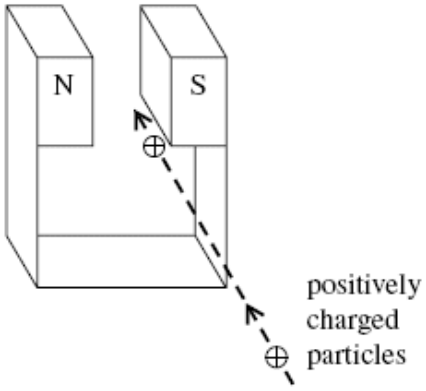
B in the opposite direction to that of the field.

C at an angle between 0° and 90° to the field.

D at right angles to the field.

(Total 1 mark)

Q3. A jet of air carrying positively charged particles is directed horizontally between the poles of a strong magnet, as shown in the diagram.



In which direction are the charged particles deflected?

A upwards

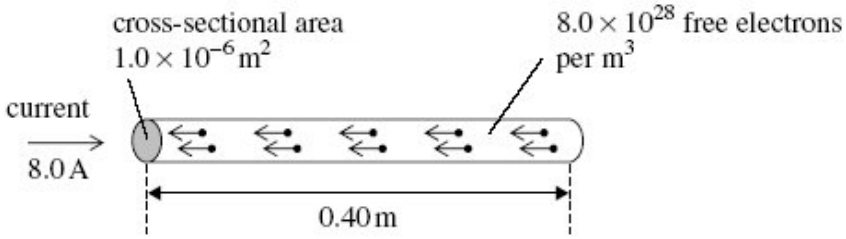
B downwards

C towards the N pole of the magnet

D towards the S pole of the magnet

(Total 1 mark)

Q4.



A current of 8.0 A is passed through a conductor of length 0.40 m and cross-sectional area 1.0×10^{-6} m^2. The conductor contains 8.0×10^{28} free electrons per m^3. When the conductor is at right angles to a magnetic field of flux density 0.20 T, it experiences a magnetic force.
What is the average magnetic force that acts on **one** of the free electrons in the wire?

A 8.0×10^{-30} N

B 5.0×10^{-29} N

C 8.0×10^{-24} N

D 2.0×10^{-23} N

(Total 1 mark)

Q5. An α particle and a β^- particle both enter the same uniform magnetic field, which is perpendicular to their direction of motion. If the β^- particle has a speed 15 times that of the α particle, what is the value of the ratio

$$\frac{\text{magnitude of force on } \beta^- \text{particle}}{\text{magnitude of force on } \alpha \text{ particle}}?$$

A 3.7

B 7.5

C 60

D 112.5

(Total 1 mark)

M1. A

[1]

M2. D

[1]

M3. B

[1]

M4. D

[1]

M5. B

[1]