

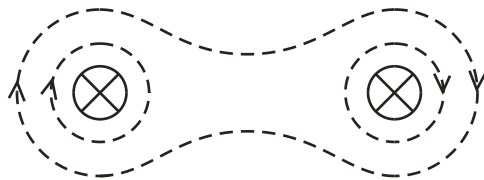
Name: _____
Date: _____

Magnetism I Answers

1. C
2. D
3. A
4. B
5. B
6. C
7. (a) (i) $\rightarrow \leftarrow$;

1

(ii)



general shape: at least one circle around each wire and one loop around both wires;
appropriate spacing of lines: increasing separation with distance from wires;
correct direction of field;

3

- (b) velocity increases;
acceleration increases;
because the force is getting larger the closer the wires get together;
Watch for ECF if force is drawn in wrong direction in (a) (i) i.e. velocity increases, acceleration decreases, force gets smaller.

3

8. (a) concentric circles;
separation increases (at least three circles required to see this);
correct direction (anticlockwise);

3

- (b) (i) current in one turn produces magnetic field in region of the other turn;
gives rise to a force on the wire;
Newton's third / idea of *vice versa* (gives rise to attraction) /
idea of *vice versa* (gives rise to shortening);

3

- (ii) use of $B = \frac{\mu_0 I}{2\pi r}$ (gives $B = 1.0 \times 10^{-4} \text{ T}$);
use of $F = BIL$;
 $= 1.0 \times 10^{-4} \times I^2 \times 2\pi \times 3.0 \times 10^{-2}$;
this force is equal to mg ;
hence $I^2 = 52.04$, and $I = 7.2 \text{ A}$;

5

[11]