

- 6 A small solenoid of area of cross section  $1.6 \times 10^{-3} \text{ m}^2$  is placed inside a larger solenoid of area of cross-section  $6.4 \times 10^{-3} \text{ m}^2$ , as shown in Fig. 6.1.

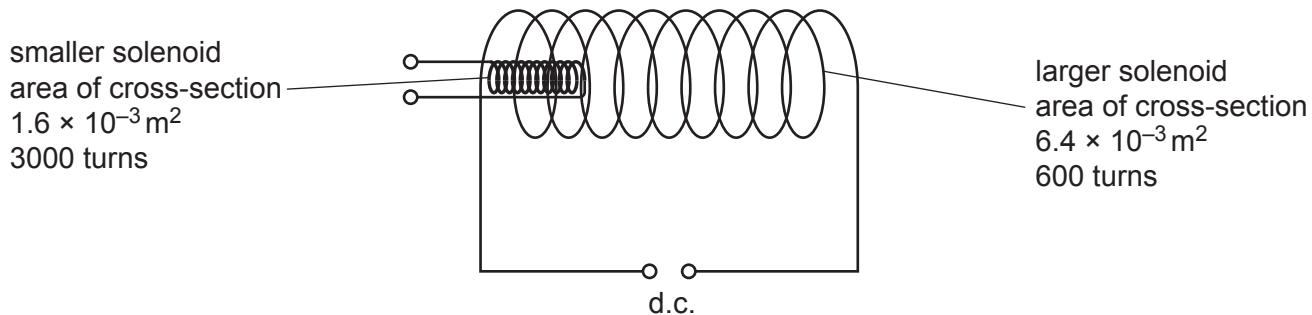


Fig. 6.1 (not to scale)

The larger solenoid has 600 turns and is attached to a d.c. power supply to create a magnetic field.

The smaller solenoid has 3000 turns.

- (a) Compare the magnetic flux in the two solenoids.

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..... [1]

- (b) Compare the magnetic flux linkage in the two solenoids.

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..... [1]

- (c) (i) State Lenz's law of electromagnetic induction.

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..... [2]

- (ii) The terminals of the smaller solenoid are connected together. The smaller solenoid is then removed from inside the larger solenoid.

With reference to magnetic fields, explain why a force is needed to remove the smaller solenoid.

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[3]