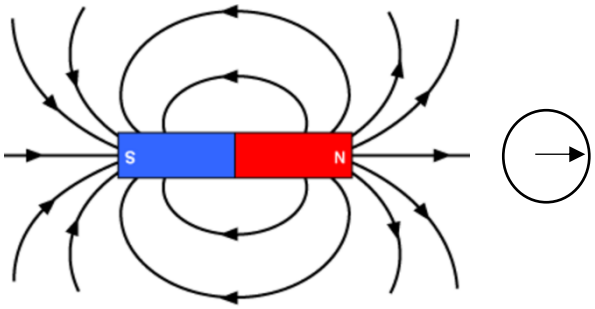
Test your knowledge answers Topic 7 Magnetism

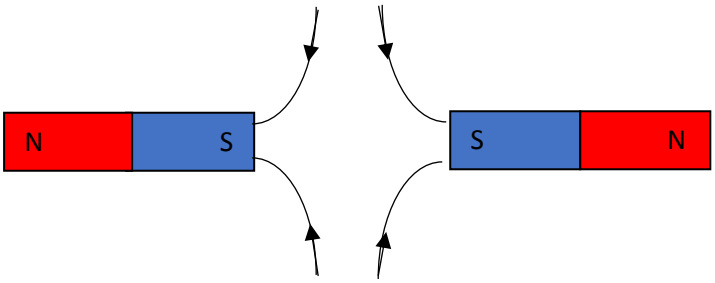
7.1 Magnets and Magnetic Fields

1. Draw the magnetic field round the following bar magnet



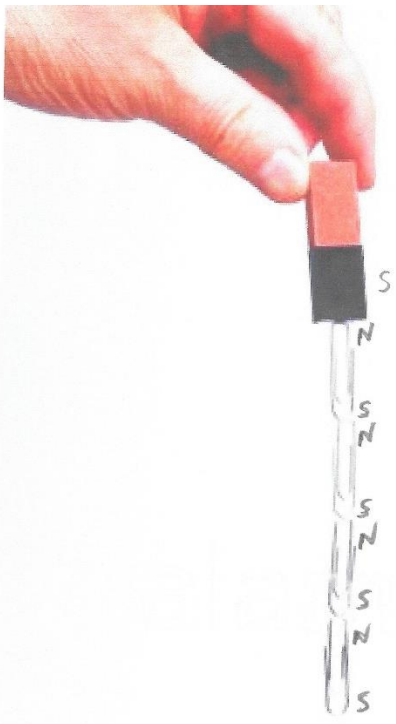
2. Add a compass to the right of the magnet and indicate which way it points

3. Draw the magnetic field between the following two magnets



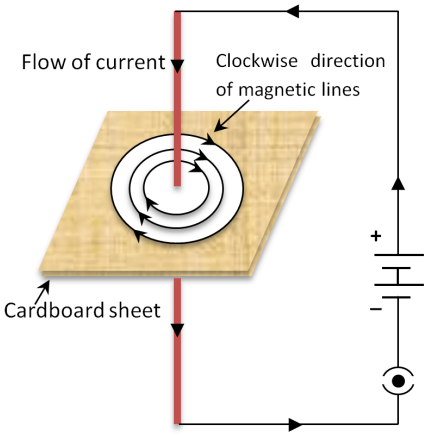
4. What are the two magnets doing ? repelling

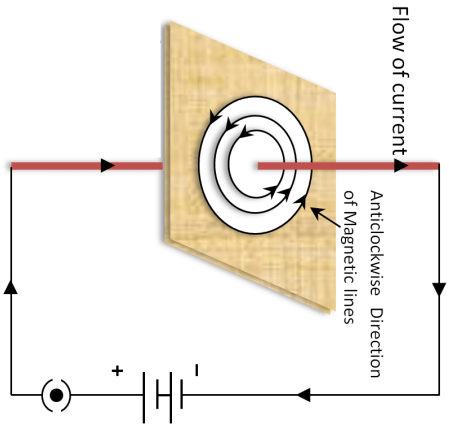
5.



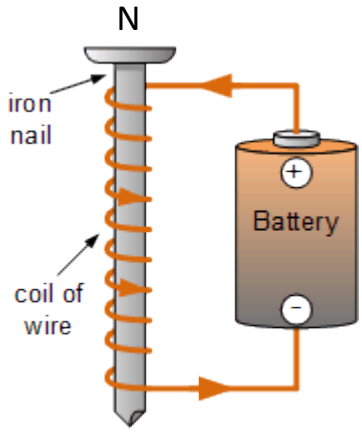
7.2 Electromagnetism

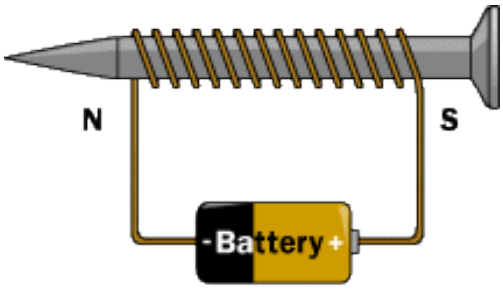
1. Draw the magnetic field round the following wires

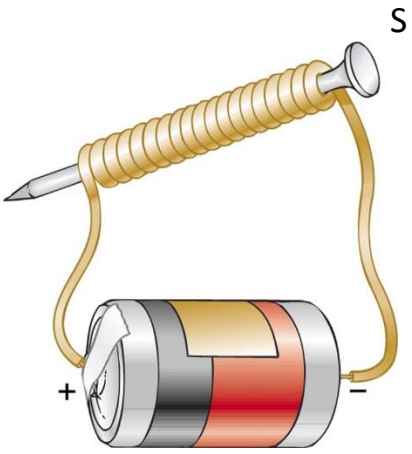


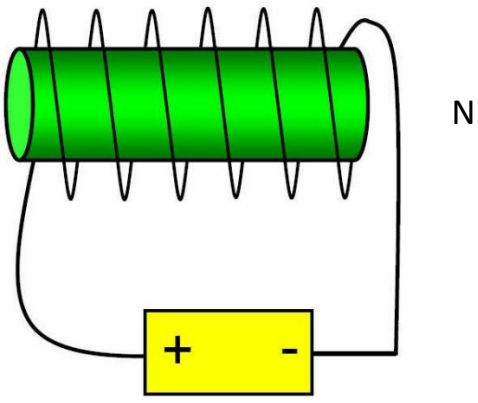


2. Identify the poles of the following electromagnets





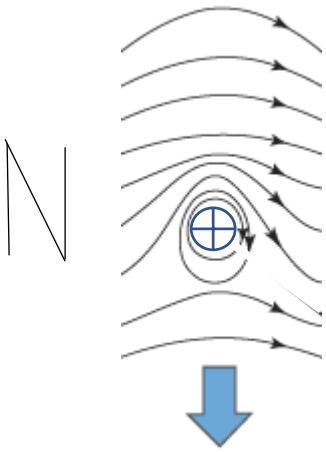




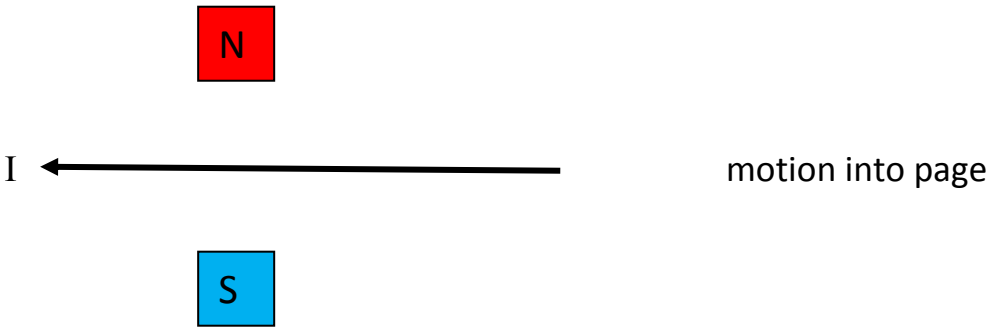
7.2.2 Fleming's left hand rule

7.2.3 Motors

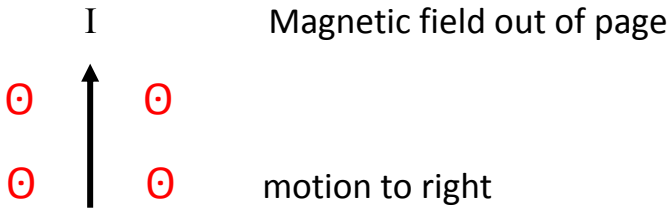
1. Draw the magnetic field round the wire in the following diagram



2. Work out the direction of motion of the following wires



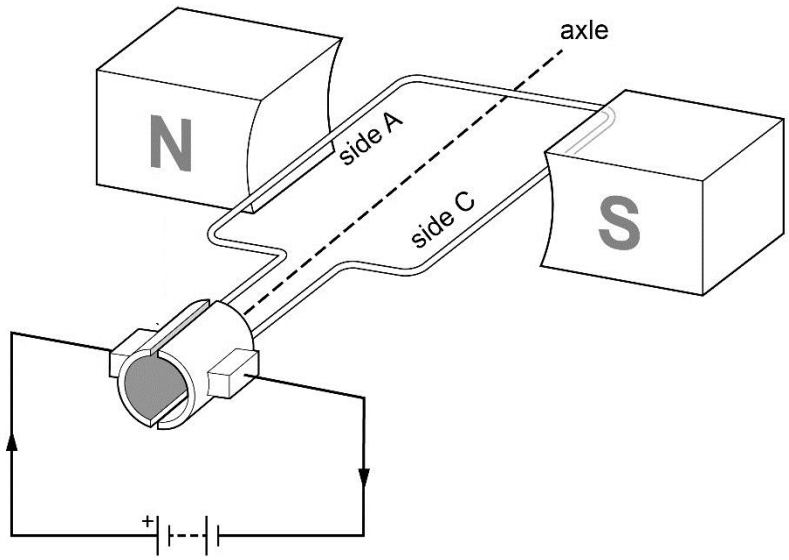
motion down



3. Use the equation $F = BIL$ to complete the table.

Force (N)	Current (A)	Length of wire (m)	Magnetic flux density (T)
0.10	2	0.25	0.20
0.25	5	0.50	0.10
0.15	10	0.10	0.15
0.05	10	0.25	0.02
0.02	2	0.20	0.05
0.03	6	0.50	0.01

4. Explain why the following motor will turn anticlockwise

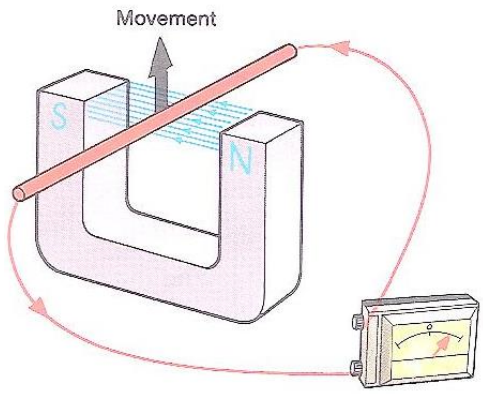


Magnetic force on side A is down, on side C is up

7.3.1 The generator effect

7.3.1 Use of the generator effect

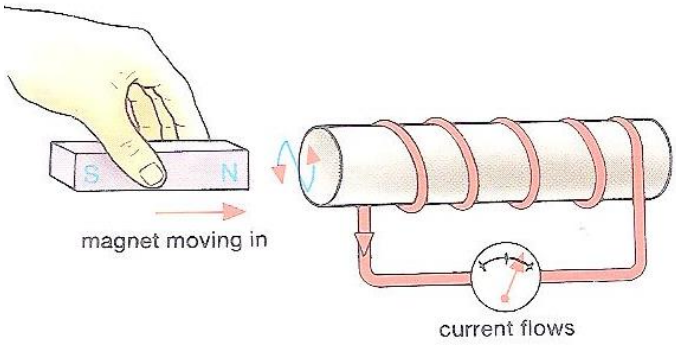
1. In the picture a positive potential difference and an anticlockwise current is being induced



(a) What is induced if the wire stops moving ? nothing

(b) What is induced if the wire moves down ? negative V, clockwise I

2. In the next picture a positive potential difference and an anticlockwise current Is being induced



(a) What is induced if the magnet is moved out of the solenoid ?
negative V, clockwise I

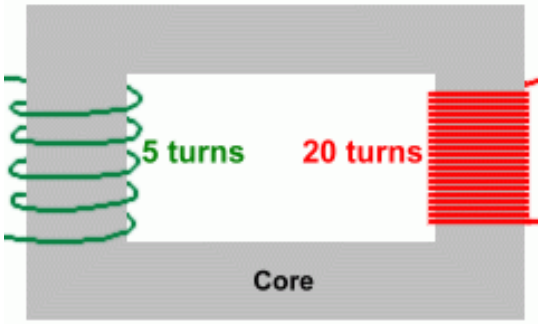
(b) What is produced if the magnet is turned round and moved into the solenoid ?
negative V, clockwise I

(c) What would be induced if the magnet was moved faster ? more V and I

3. What is the difference between an alternator and a dynamo ?
Alternator produces ac. Dynamo produces dc

7.3.4 Transformers

1. Work out the secondary voltage of the following transformers if the primary voltage is 100V

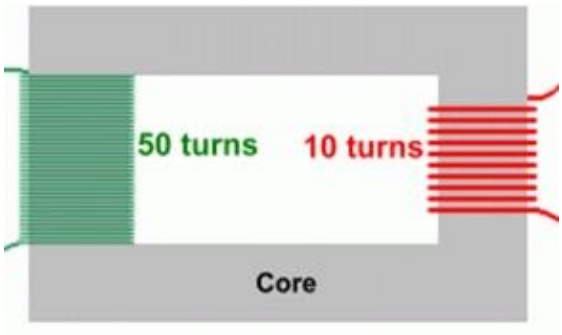


$\frac{N_S}{N_P} = \frac{V_S}{V_P}$

$\frac{20}{5} = \frac{V_S}{100}$

$V_S = 4 \times 100 = 400V$

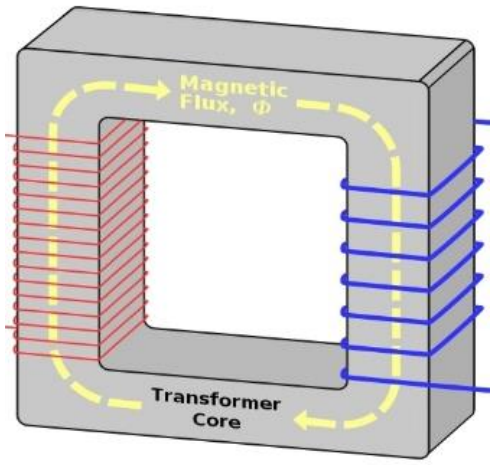
Step up



$\frac{10}{50} = \frac{V_S}{100}$

$V_S = 0.2 \times 100 = 20V$

Step down



$\frac{6}{16} = \frac{V_S}{100}$

$V_S = 0.375 \times 100 = 37.5V$

Step down

2. Identify which transformers are step up type and which are step down type

3. If the primary current of the first transformer was 2A :-

(a) Work out the input power $P = I_P V_P = 2A \times 100V = 200W$

(b) Work out the secondary current assuming the transformer is 100% efficient

$200W = I_S V_S = I_S \times 400V \qquad I_S = 0.5A$