AQA GCSE Physics

Paper 2 (H) Revision

Topic 7: Electromagnetism

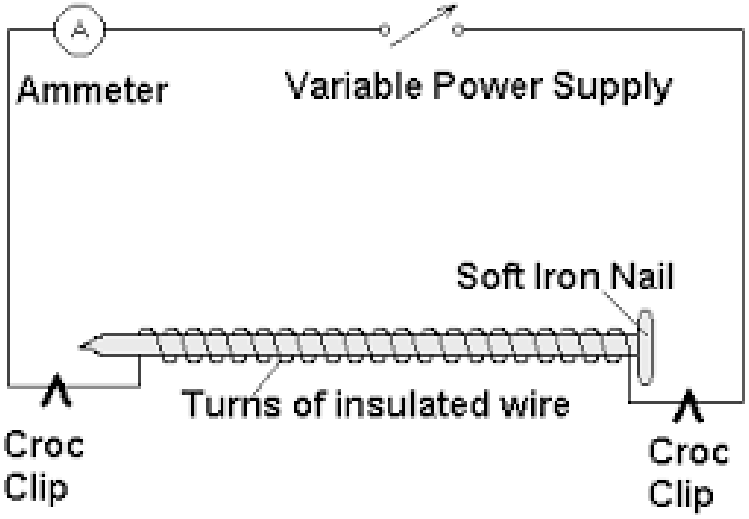
Name: _____

Form: 11 ___

AQA GCSE Physics
Paper 2 Revision
Topic 7: Electromagnetism

Specification point	Notes ✓	☺		☹	Questions?
What can we say about the force between two magnets?					
What do we mean by magnetic field lines?					
What do we use electromagnets for?					
How can we change the size of the force on a current-carrying wire in a magnetic field?					
How can we reverse the direction of the force on a current-carrying wire in a magnetic field?					
How do we use the motor effect to make objects move?					
What do we mean by electromagnetic induction?					
How can we use a magnet to induce a potential difference across the ends of a conductor?					
How can we induce a potential difference if we use an electromagnet instead of a magnet?					
Why do transformers only work with ac?					
What is the core of a transformer made from?					
How does a switch mode transformer differ from an ordinary transformer?					
Why are transformers used in the National Grid?					
How does the ratio of the primary pd to the secondary pd depend on the number of turns on each coil?					
What is the difference between a step-up and a step-down transformer?					
What can we say about a transformer which is 100% efficient?					

Electromagnets

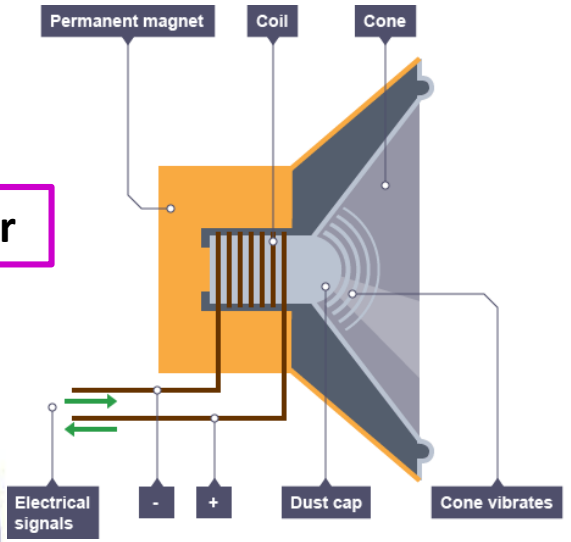


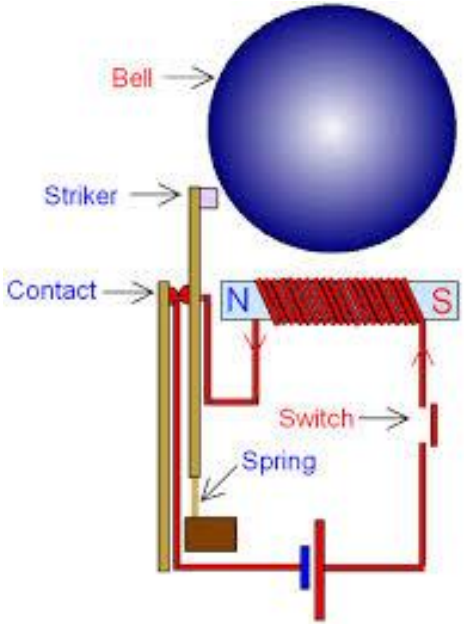
Can you use your knowledge of making electromagnets to explain how the following objects work?

Three ways to **increase** the strength of the electromagnet:

- Increase the **current**
- Increase the **number of turns** of wire
- Use an **iron core**

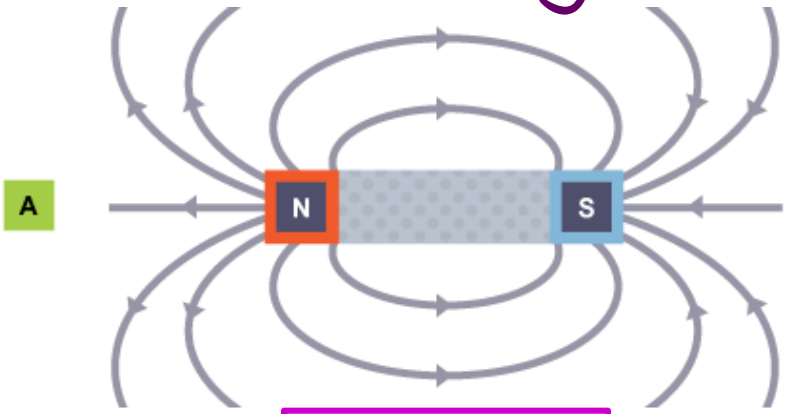
Loudspeaker



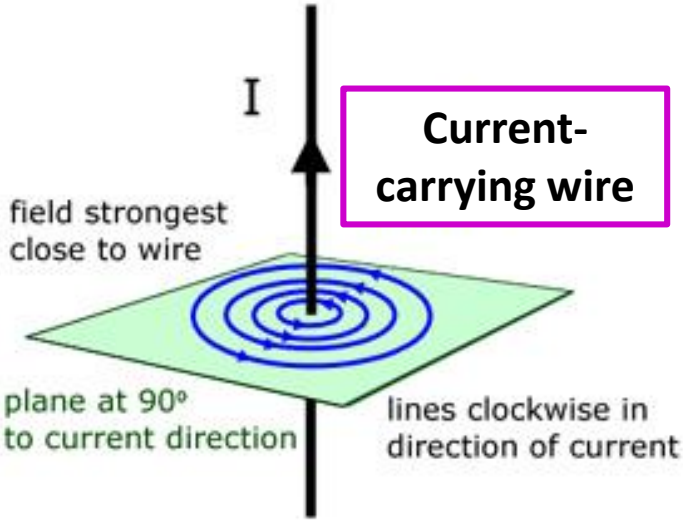


Fire Bell

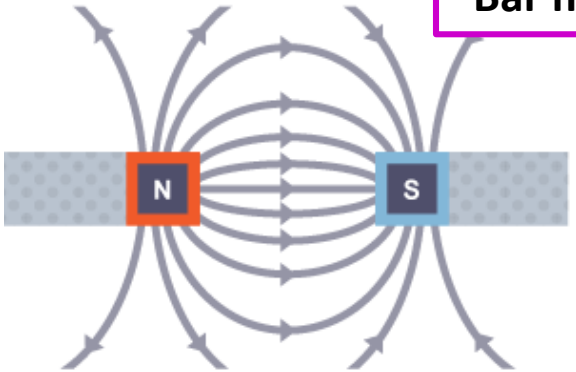
Magnetic Fields

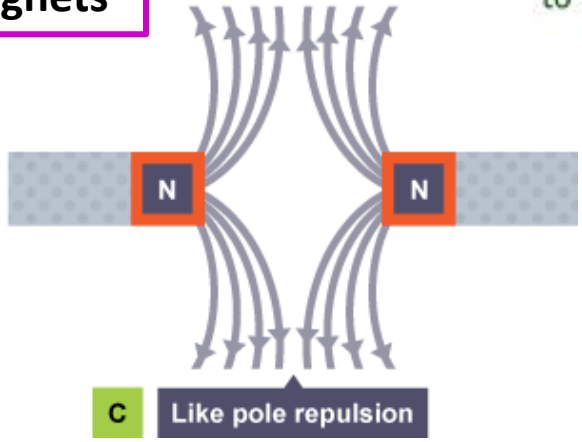


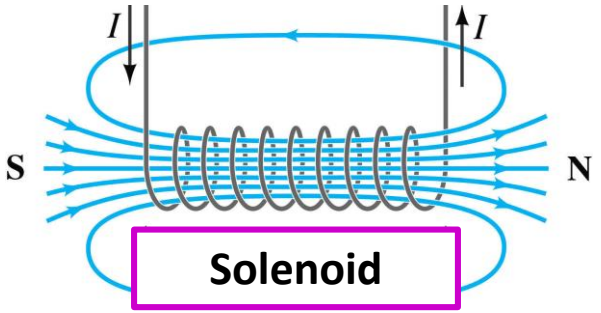
Bar magnets



Current-carrying wire



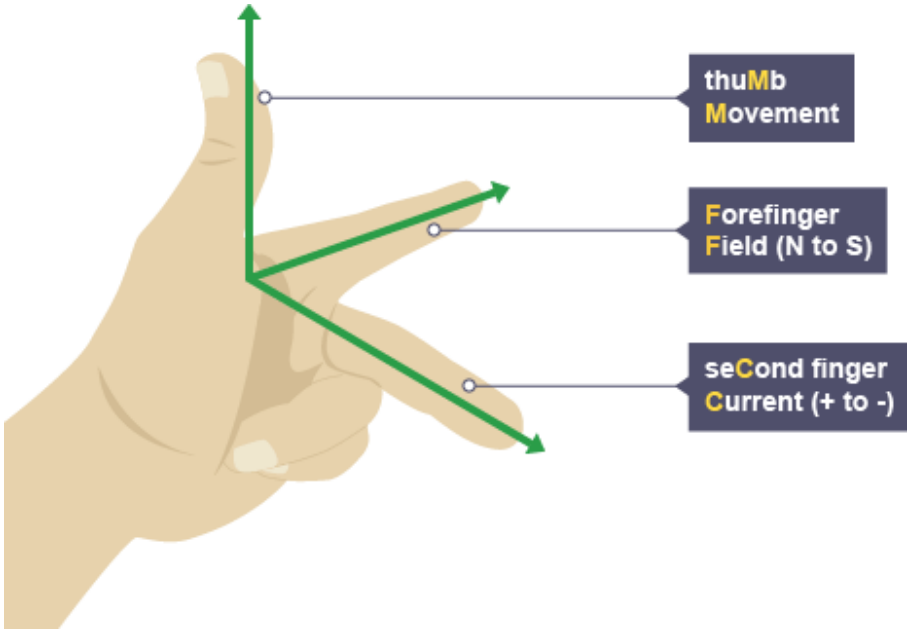


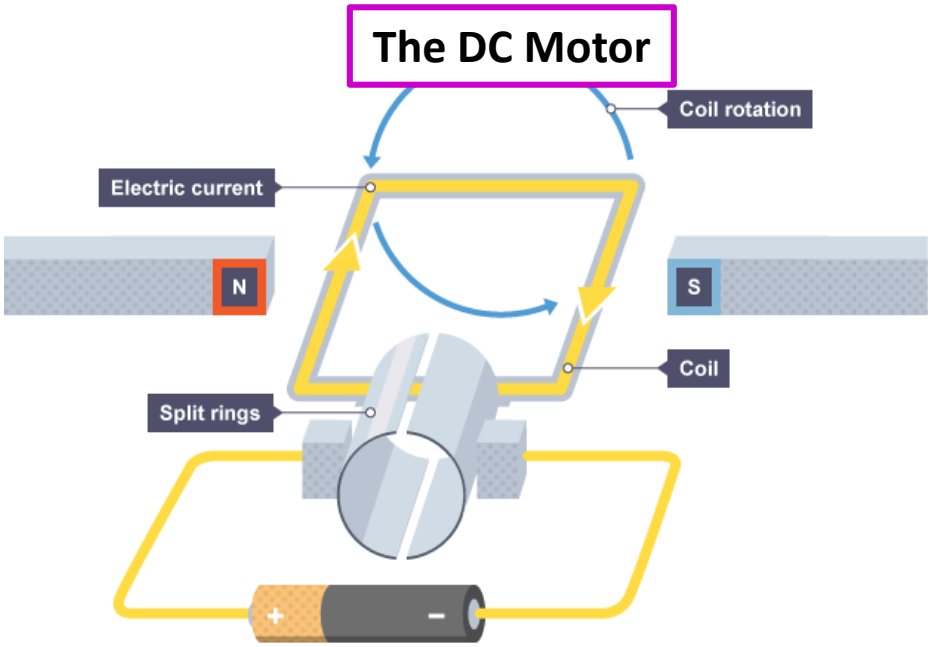


Solenoid

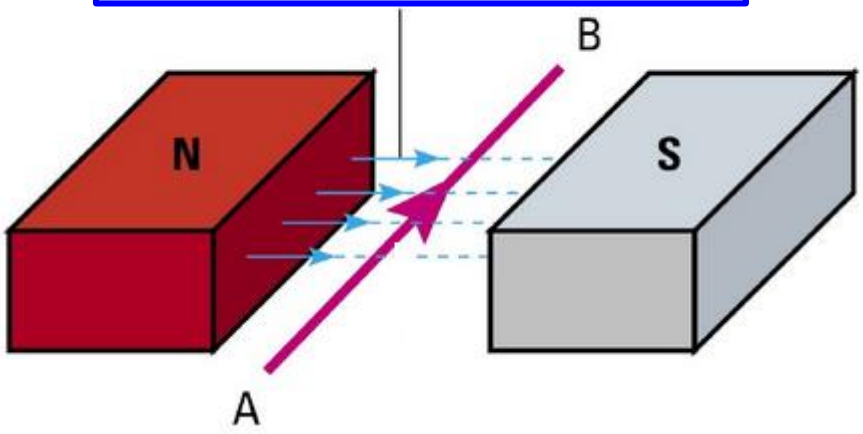
What does the Earth's magnetic field look like?

The Motor Rule



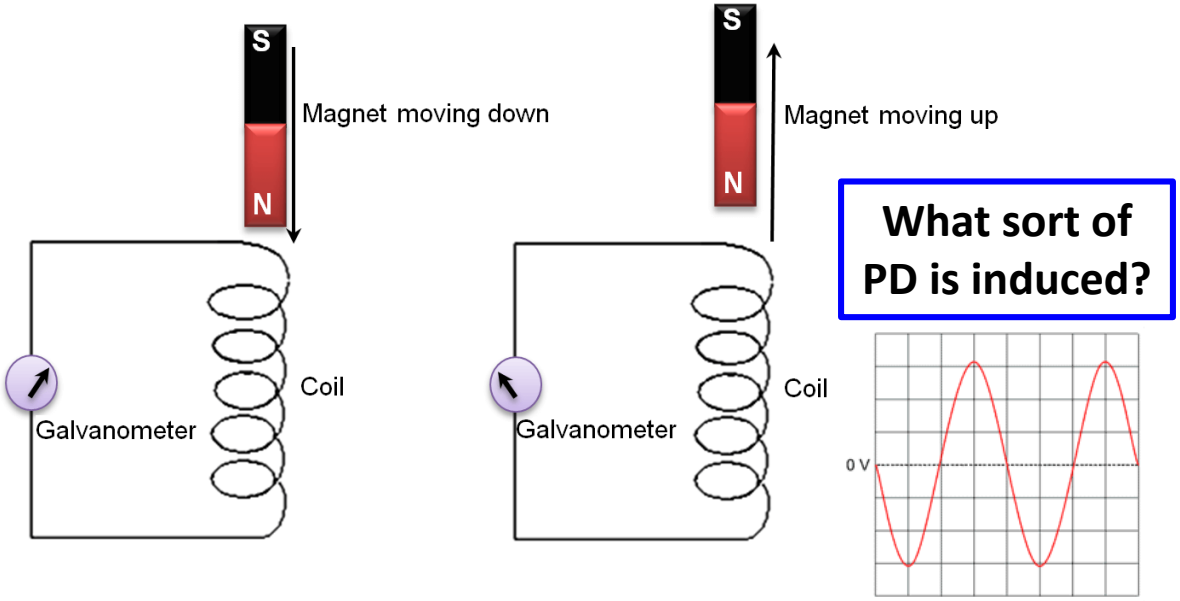


If the Current travels from A to B, which way will the wire move?



Can you use your knowledge of Fleming's Left Hand Rule to explain how the DC motor functions?

EM Induction

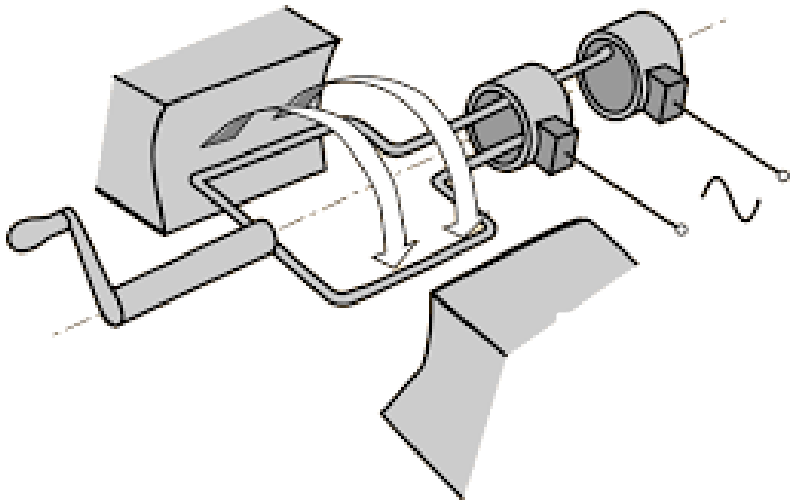


What sort of PD is induced?

Three ways to **increase** the size of the induced potential difference:

- Increase the **strength of the magnet**
- Increase the **number of turns** of wire in the coil
- Move the magnet at a **higher frequency**

Can you use your knowledge of Fleming's Left Hand Rule to explain how the AC generator functions?



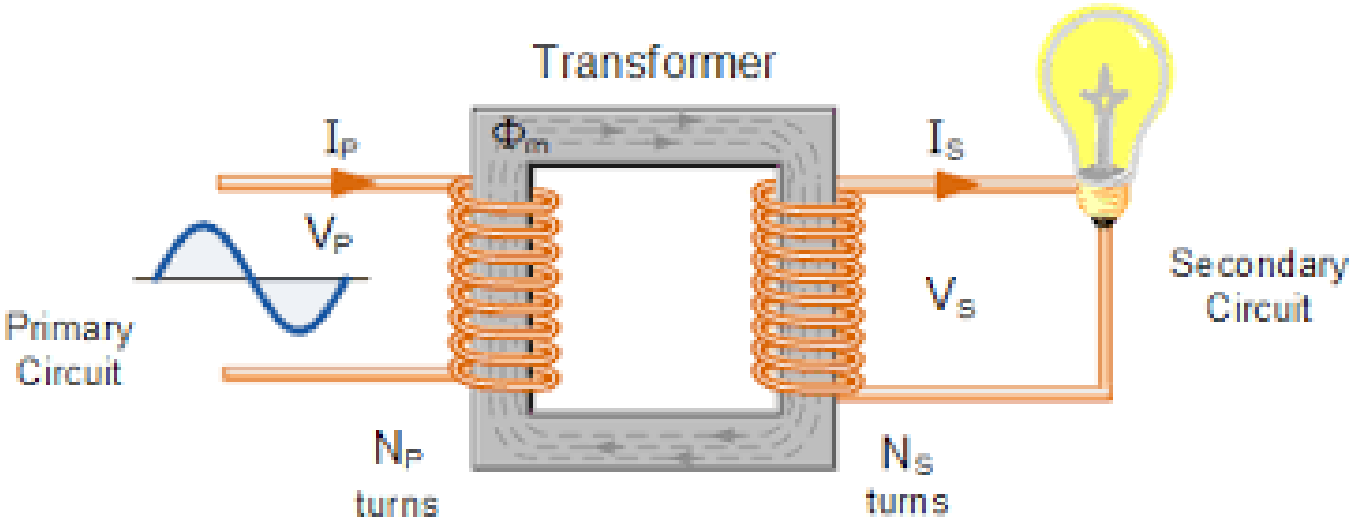
Transformers

Turns-ratio Equation:

$V_p/V_s = N_p/N_s$

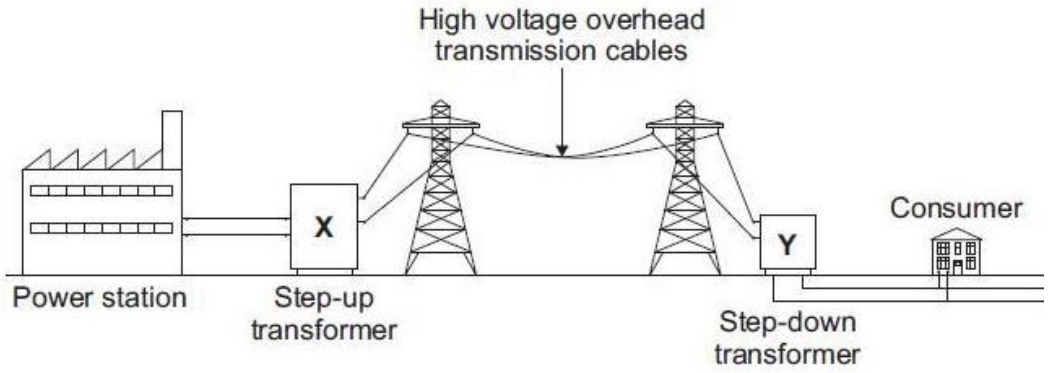
If the transformer is 100% efficient:

$V_p \times I_p = V_s \times I_s$



The **AC potential difference** applied to the primary coil induces an **alternating magnetic field** in the iron core.

This induces an **alternating PD in the secondary coil**.



What are the differences between step-up and step-down transformers?
Why is each one used in a certain place in the national grid?

Key Equations

On the Data Sheet

$$\frac{V_P}{V_S} = \frac{n_P}{n_S}$$

V_p → PD across primary coil, in Volts (V)
V_s → PD across secondary coil, in volts (V)
n_p → turns on primary coil, no unit
n_s → turns on secondary coil, no unit

$$V_P I_P = V_S\ I_S$$

V_p → PD across primary coil, in Volts (V)
V_s → PD across secondary coil, in volts (V)
I_p → current through primary coil, in Amps (A)
I_s → Current through secondary coil, in Amps (A)

$$F = BIl$$

F → Force on conductor perpendicular to magnetic field, in Newtons (N)
B → Magnetic field strength, in Teslas (T)
I → Current through conductor, in Amps (A)
L → Length of conductor, in metres (m)

Not on the Data Sheet