

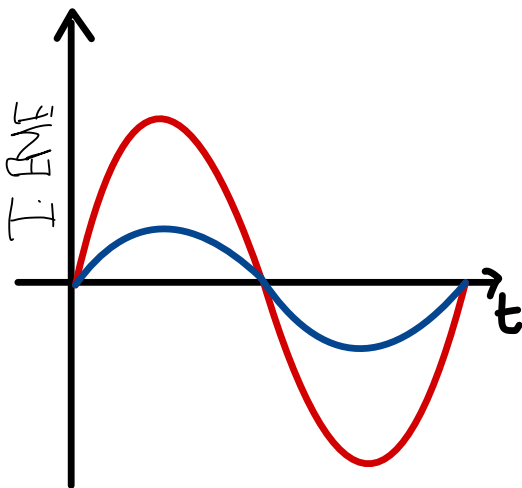
Concept of electro magnetic inductor

This term refers to producing electricity using the effects of a magnet. This experiment was demonstrated by Faraday. His observations and conclusions are given below:

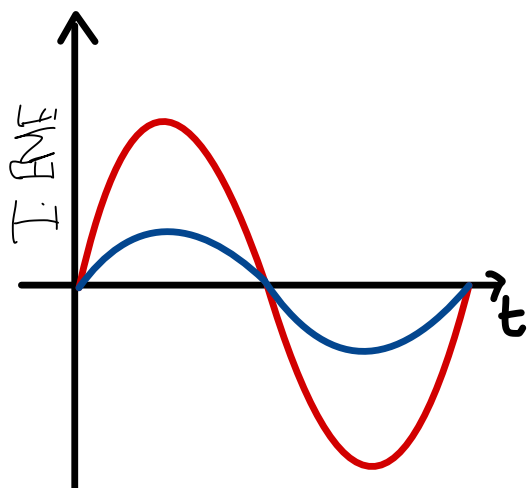
- when the magnetic was pushed into the solenoid as shown in fig.1 the volt meter gave a reading in one direction
- When the magnet was pulled out of the solenoid, the voltmeter gave a reading in the opposite direction, (this indicated that the voltage/current produced can be classified as alternating current)
- When the magnet was held stationary inside the solenoid, no voltage was induced, thus the voltmeter gave a zero reading.
- Based on the above observations Faraday concluded that whenever there is a change in cutting effect between the magnetic field lines and the coils of the solenoid, voltage or EMF is induced in the circuit

If the following changes are made the shape of the graph will be affected as shown below:

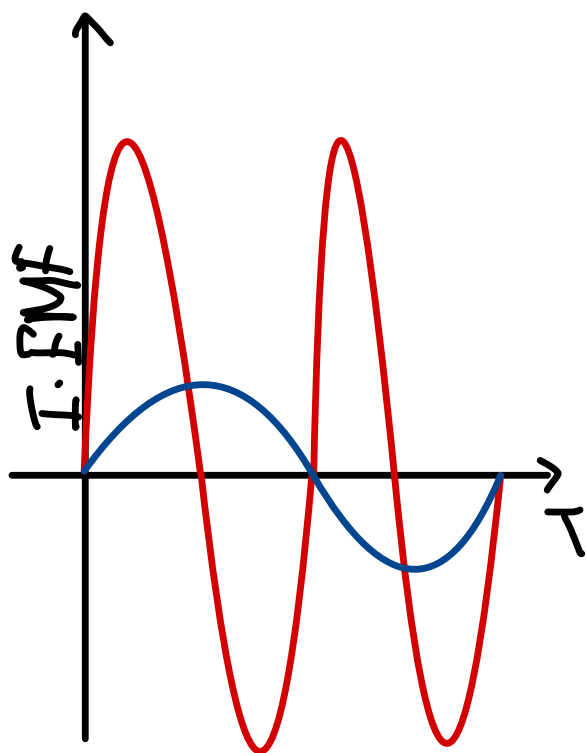
Powerful magnet:



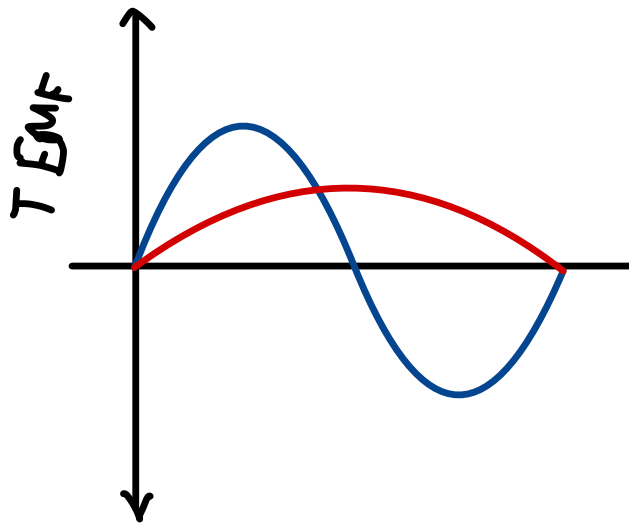
Increase the number of turns of the coils



Increase speed of magnet :

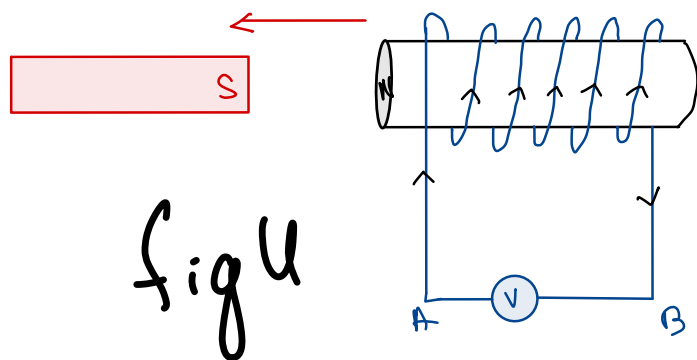
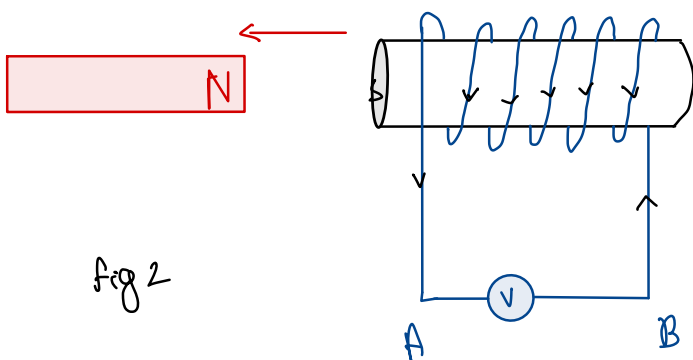
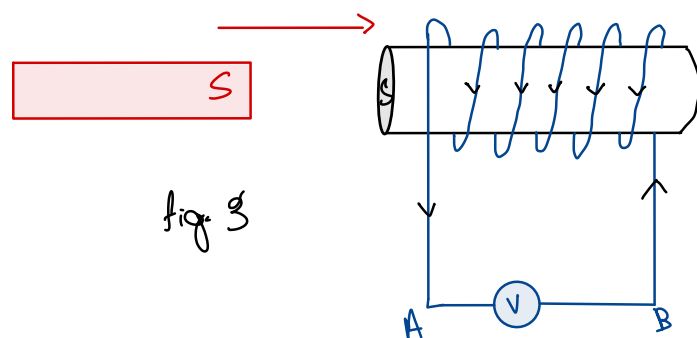
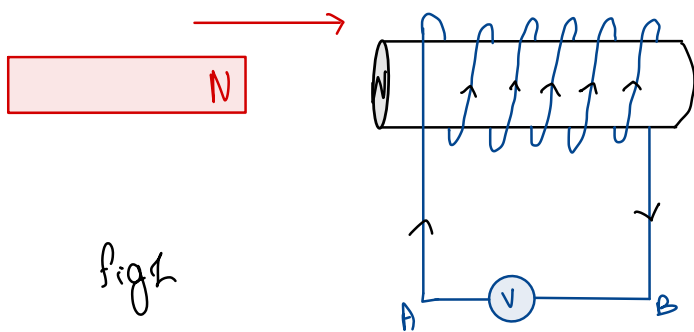


Decreasing the speed:



How to determin the direction of induced current:

The direction of indicued current can be worked out using lenzes law. According to this law induced current always flows in a direction which is opposite to the motion of a magnet. The direction of induced current can be worked out using the following diagrams

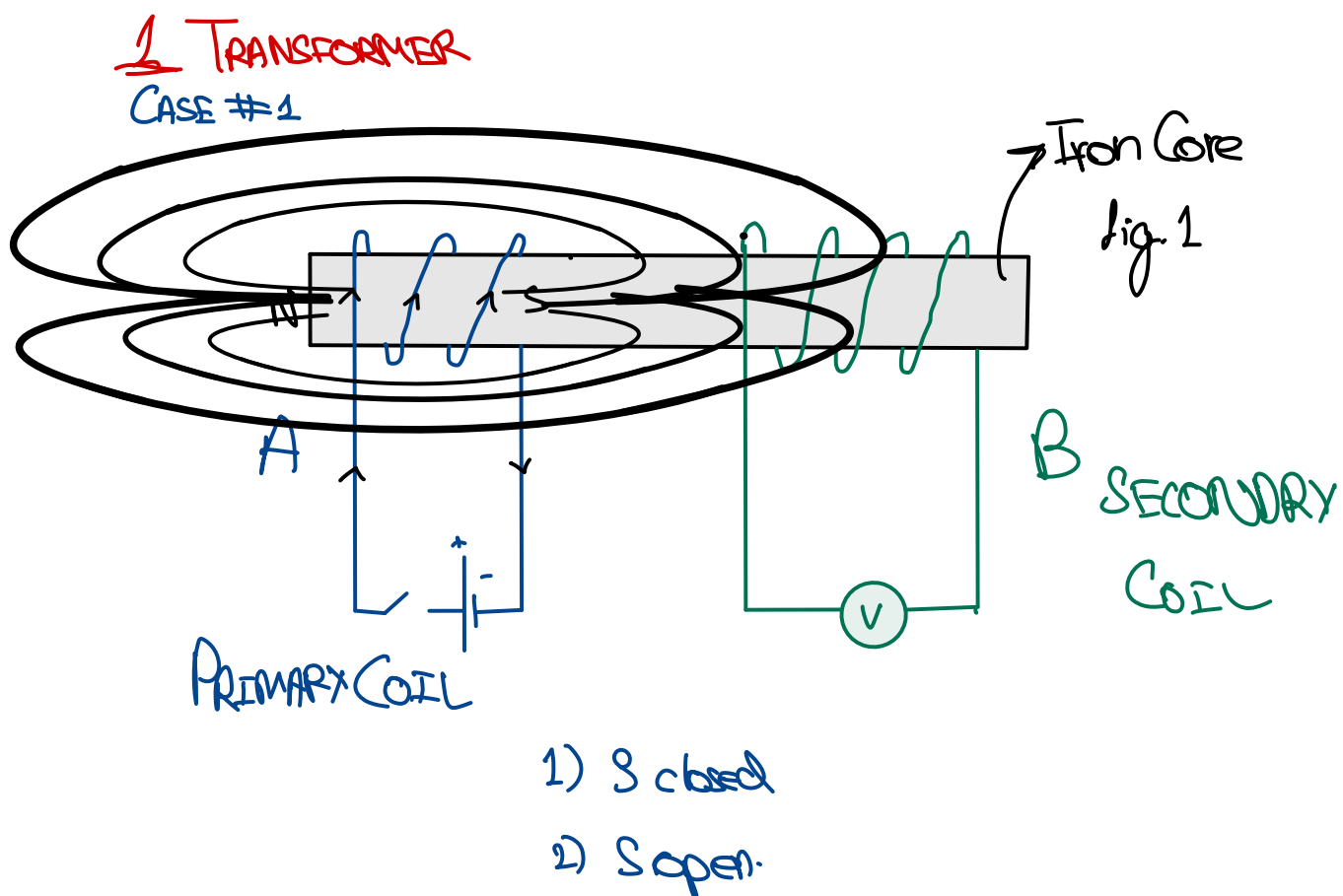


- when a magnet is pushed in, same pole is induced (fig.1 and fig.3)
- When a magnet is pulled out opposite pole is induced (fig.2 and fig.4)
- Pushing in of the north creates the same effect as pulling out of the south
- Pulling out of the north creates the same effect as pushing in of south

Application of electromagnetic induction

Transformers :

The diagram in fig.1 shows a circuit.



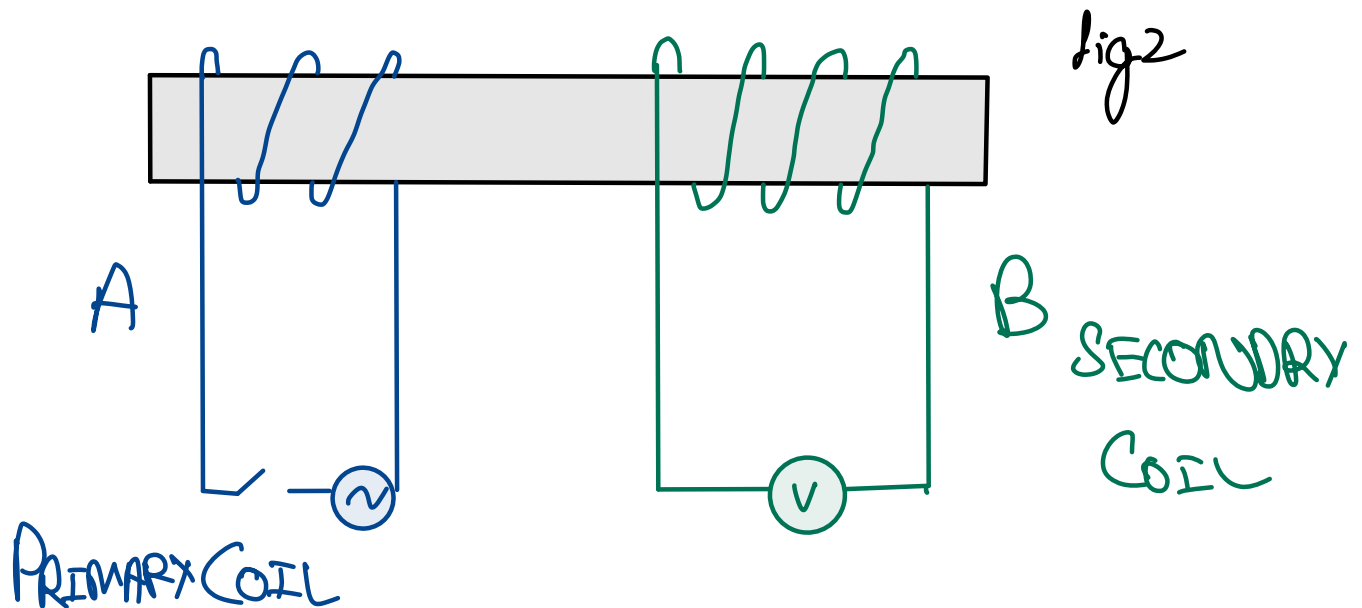
Suggest what happens when the switch is closed.

The voltmeter gives a reading briefly in one direction and this reading quickly returns to zero.

Suggest what happens when the switch is open

A reading is again observed in the opposite direction for a brief moment and this reading quickly returns to 0

The dc supply is now replaced with an ac supply as shows in fig.2. Suggest what happens when the switch is closed



As the direction of the current keeps changing, the direction of the magnetic field also changes. Hence a change in cutting effect is observed therefore the voltmeter gives a continuous reading in both directions