

Faraday's Electromagnetic Lab

Spoken Tutorial Project

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

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Learning Objectives



Learning Objectives

- ▶ **Demonstrate Faraday's Electromagnetic Lab, PhET simulation**



System Requirement



System Requirement

- ▶ **Ubuntu Linux OS v 14.04**



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- ▶ **Java v 1.8.0**



System Requirement

- ▶ **Ubuntu Linux OS v 14.04**
- ▶ **Java v 1.8.0**
- ▶ **Firefox web browser v 61.0.1**



Pre-requisites



Pre-requisites

- ▶ **Learner should be familiar with topics in high school Physics**



Learning Goals



Learning Goals

- ▶ **Predict the change in magnetic field as the magnet moves**



Learning Goals

- ▶ **Predict the change in magnetic field as the magnet moves**
- ▶ **Study the deflections of compass with respect to the magnetic field**



Learning Goals

- ▶ Predict the change in magnetic field as the magnet moves
- ▶ Study the deflections of compass with respect to the magnetic field
- ▶ Compare the change in voltage with an induced EMF



Learning Goals



Learning Goals

- ▶ **Explain the cause of electromagnetic induction**



Learning Goals

- ▶ Explain the cause of **electromagnetic induction**
- ▶ Explain the working of a **transformer**



Learning Goals

- ▶ Explain the cause of **electromagnetic induction**
- ▶ Explain the working of a transformer
- ▶ **Show how a generator works**



PhET Simulation-Link



PhET Simulation-Link

<https://phet.colorado.edu>



Assignment



Assignment

- ▶ **Replace the bulb with voltage meter**



Assignment

- ▶ Replace the bulb with voltage meter
- ▶ Observe the change in the induced EMF when,



Assignment

- ▶ **Replace the bulb with voltage meter**
- ▶ **Observe the change in the induced EMF when,**



Assignment

- ▶ Replace the bulb with voltage meter
- ▶ Observe the change in the induced EMF when,
 - ▶ Magnet is moved rapidly



Assignment

- ▶ Replace the bulb with voltage meter
- ▶ Observe the change in the induced EMF when,
 - ▶ Magnet is moved rapidly
 - ▶ **Polarity of magnet is flipped**



Assignment

- ▶ Replace the bulb with voltage meter
- ▶ Observe the change in the induced EMF when,
 - ▶ Magnet is moved rapidly
 - ▶ Polarity of magnet is flipped
- ▶ Explain your observation



Assignment



Assignment

- ▶ **Change the number of loops of the coil**



Assignment

- ▶ **Change the number of loops of the coil**
- ▶ **Observe the magnetic field(B) values**



Assignment



Assignment

- ▶ Check what happens when frequency slider of **AC Current Supply** is moved to 5%?



Assignment

- ▶ Check what happens when frequency slider of **AC Current Supply** is moved to 5%?
- ▶ **Explain your observation**



Assignment



Assignment

What changes do you see in the working of the generator, when



Assignment

What changes do you see in the working of the generator, when

- ▶ **Number of loops and loop area of the wire are changed**



Assignment

What changes do you see in the working of the generator, when

- ▶ Number of loops and loop area of the wire are changed
- ▶ Bar magnet strength is reduced to 0%?



Assignment

What changes do you see in the working of the generator, when

- ▶ Number of loops and loop area of the wire are changed
- ▶ Bar magnet strength is reduced to 0%?
- ▶ **Explain your observation**



Summary



Summary

- ▶ **How to use Faraday's Electromagnetic Lab, PhET simulation**



Summary



Summary

- ▶ Predicted the change in magnetic field as the magnet moves
- ▶ Studied the deflections of compass with respect to the magnetic field
- ▶ Compared the change in voltage with an induced EMF



Summary



Summary

- ▶ Explained the cause of electromagnetic induction
- ▶ Explained how a transformer works
- ▶ Shown how a generator works



About the Spoken Tutorial Project

- ▶ Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- ▶ It summarises the Spoken Tutorial project



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- ▶ If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to contact@spoken-tutorial.org



Forum for specific questions

- ▶ Do you have questions in **THIS Spoken Tutorial?**
- ▶ Please visit
<http://forums.spoken-tutorial.org>
- ▶ Choose the minute and second where you have the question
- ▶ Explain your question briefly
- ▶ Someone from our team will answer them



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- ▶ It is supported by the National Mission on Education through ICT, MHRD, Government of India
- ▶ More information on this Mission is available at

<http://spoken-tutorial.org/NMEICT-Intro>

