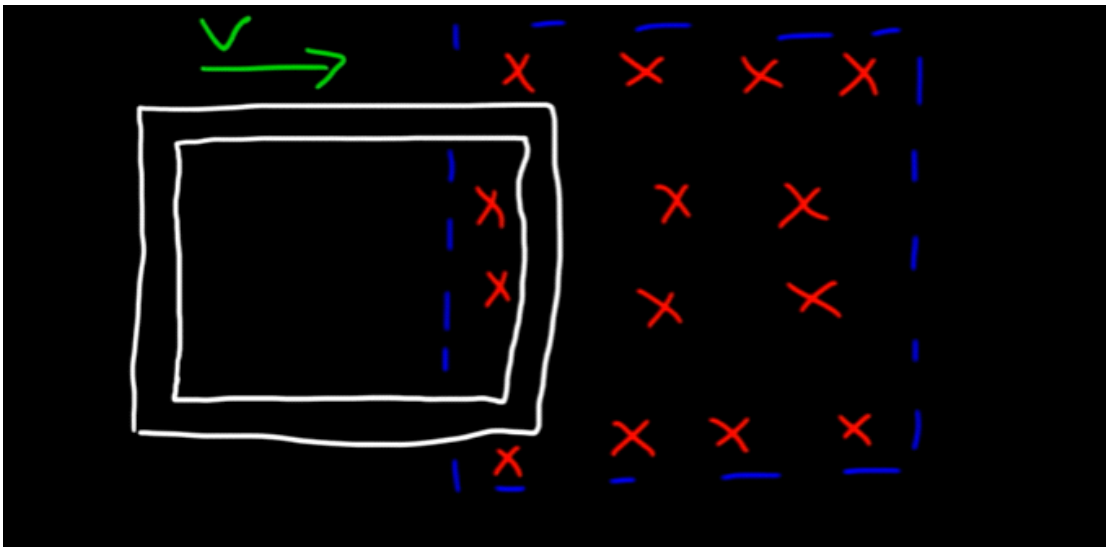
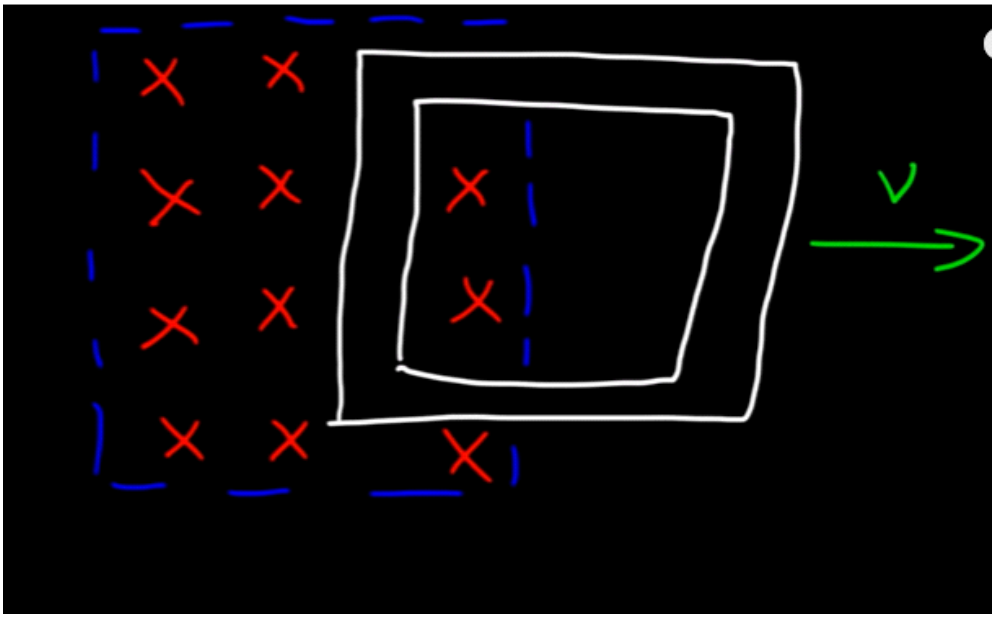
Electricity and Magnetism

July 22, 2021 6:26 AM

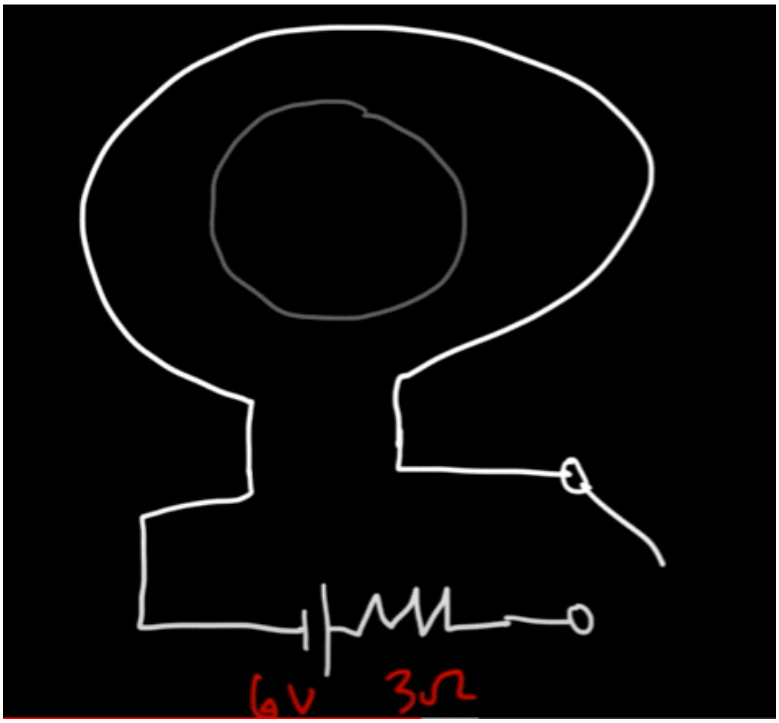
1. A square coil (20cm x20cm) of wire consists of 50 loops. The magnetic field is perpendicular to the face of the coil and increases from -3T to 5T in 0.1s. The coil is connected across a 20 phm resistor. (a)Calculate the induced emf in the coil. (b) How much current flows through the resistor? c. How much power is dissipated by the resistor?

2.

1. 

3. 

3. What is the direction of the current in the induced magnetic field?

4. 

4. 1. A single circular loop of wire (R = 25cm) is perpendicular to a magnetic field which increases from 1.5T to 4.8T in 23ms. (a) Calculate the change in magnetic flux. (b) What is the induced emf? (c) Calculate the induced current in the wire if the total resistance is 20 ohms.

1. 5. A moving rod 45cm long slides to the right with a speed of 2 m/s in a magnetic field of 8.0T. (a) What is the induced emf? (b) What is the electric field in the rod? (c) What is the current in the rod? (d) What force is required to keep the rod moving to the right at a constant speed of 2 m/s?

2. At what frequency will a 250mH inductor have an inductive reactance of 700 ohms?

5. A 500Hz AC signal at 60V draws a current of 2.5A when connected across an inductor. (a) What is the inductive reactance? (b) Calculate the inductance of the inductor.

6. A 800Hz AC signal at 100V is connected across a RL circuit consisting of a 300 ohm resistor and an 80mH inductor. (a) Calculate the inductive reactance. (b) What is the impedance? (c) Calculate the current. (d) What is the phase angle. (e) Calculate the power dissipated by the circuit.

7. A 2.5KHz AC signal at 60V is connected across a RC circuit consisting of a 50 ohm resistor and a 1.5uF capacitor. (a) Calculate the capacitive reactance. (b) What is the impedance? (c) Calculate the current. (d) What is the phase angle? (e) Determine the power dissipated by the circuit.