

### Answer on Question #54102-Physics-Electromagnetism

Two flat circular coins, X having a radius 5 cm and 6 turns and Y having a radius 10 cm and 4 turns are situated in a uniform magnetic field for which the field is changing at a constant rate. The ratio of emf induced in X to the emf induced in Y will be

#### Solution

The emf induced is given by the formula

$$\varepsilon = -\frac{d\Phi}{dt} = -NA\frac{dB}{dt},$$

where  $N$  is the number of turns,  $A = \pi r^2$  is the area,  $B$  is the magnetic induction.

The ratio of emf induced in X to the emf induced in Y will be

$$\frac{\varepsilon_X}{\varepsilon_Y} = \frac{-N_X A_X \frac{dB}{dt}}{-N_Y A_Y \frac{dB}{dt}} = \frac{-N_X r_X^2}{-N_Y r_Y^2} = \frac{-6 \cdot 5^2}{-4 \cdot 10^2} = \frac{3}{8}.$$

**Answer:**  $\frac{3}{8}$ .