

1. The magnetic field is normal to the plane of the loop and is uniform over the loop. Thus at any instant the magnetic flux through the loop is given by $\Phi_B = AB = \pi r^2 B$, where $A = \pi r^2$ is the area of the loop. According to Faraday's law the magnitude of the emf in the loop is

$$\mathcal{E} = \frac{d\Phi_B}{dt} = \pi r^2 \frac{dB}{dt} = \pi (0.055 \text{ m})^2 (0.16 \text{ T/s}) = 1.5 \times 10^{-3} \text{ V} .$$