

- (a) An $8.0\mu\text{F}$ capacitor is connected to the terminals of a 60Hz . AC source whose rms voltage is 150V . Find the capacitive reactance and rms current in the circuit.
(b) If the frequency is doubled, calculate the new rms current.

(a) As in previous solution the capacitive reactance of the circuit will be

$$X_c = \frac{1}{2\pi f * C} = \frac{1}{2 * \pi * 60 * 8 * 10^{-6}} = 331.57\Omega$$

The rms current is given by according to Ohm's law as

$$I_{rms} = \frac{V_{rms}}{X} = \frac{150}{331.57} = 0.452\text{A}$$

(b) If the frequency is doubled, the reactance will be halved and the current will be doubled, hence the new current will be

$$I'_{rms} = 2 * I_{rms} = 2 * 0.452 = 0.904\text{A}$$

www.physicshelpline.com