

## Answer on Question 42599, Physics, Electric Circuits

$$I = 10 \sin 314t = 10 \sin 100\pi t \quad .$$

The period of given sine function is  $T = \frac{2\pi}{\omega} = \frac{2\pi}{100\pi} = \frac{1}{50}$  .

By definition, average value of function  $f(x)$  over time  $t$  is  $\frac{1}{t} \int_0^t f(x) dx$  .

Hence, average of  $I^2$  is  $50 \cdot \int_0^{\frac{1}{50}} 100 \sin^2 100\pi t = 50 \cdot 100 \left( \frac{t}{2} - \frac{\sin(200\pi t)}{400\pi} \right) \Big|_0^{\frac{1}{50}} = 50 \cdot 100 \cdot \frac{1}{100} = 50$  .