27 When a steady direct current of value I passes through a heating element of resistance R, the time taken to raise the temperature of water of mass m by 10 K is T.

When a sinusoidal alternating current with a peak current of value I passes through a heating element of resistance $2R$, what is the time taken to raise water of mass m by 10 K?

A $\sqrt{2}\,T$

B T

C $\frac{T}{2}$

D $\frac{T}{4}$