

### Answer on Question #74747 Physics / Other

A  $C = 2 \mu\text{F}$  capacitor charged originally to a potential difference of  $V = 60 \text{ V}$  is discharged across a  $R = 22 \text{ m}\Omega$  resistor. Calculate the time constant of the circuit and the potential difference across the capacitor after this time constant time?

#### Solution:

The time constant

$$\tau = RC = 22 \times 10^{-3} \times 2 \times 10^{-6} = 44 \times 10^{-9} \text{ s} = 44 \text{ ns.}$$

The potential difference across the capacitor

$$V(t) = Ve^{-t/\tau}$$

So

$$V(\tau) = Ve^{-1} = 60e^{-1} = 22 \text{ V.}$$

**Answers:** 44 ns, 22 V

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