

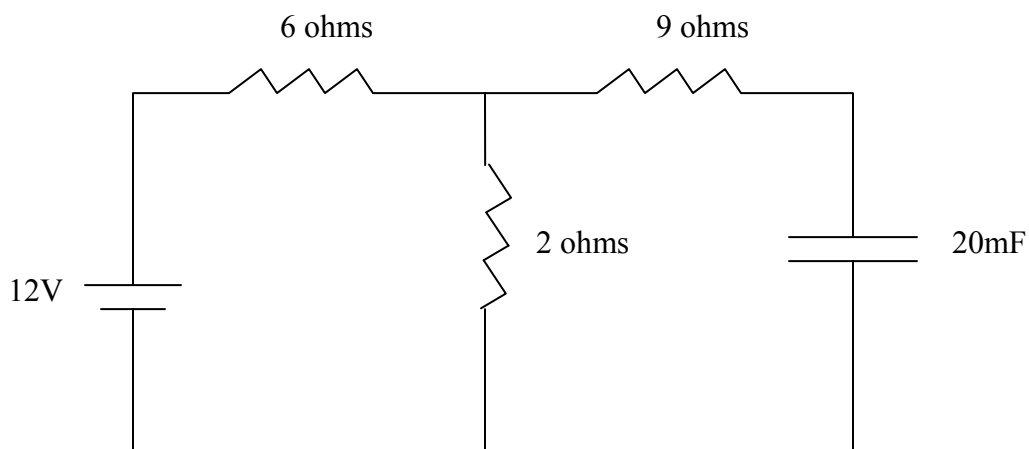
TOPIC

Electricity and Magnetism

QUESTION

Shown below is a circuit connected to a voltage source of 12V. At steady state, the voltage across the capacitor most nearly is

- (A) 3V
- (B) 12V
- (C) 1.5V
- (D) 11.57V

**HINT**

The circuit at steady state will behave as if the capacitor is an open circuit. This is because the capacitor has been charged and hence no more current can flow through it. The 6Ω and 2Ω resistor are in the closed circuit.

$$\begin{aligned} R_{e_q} &= R_1 + R_2 \\ &= 6 + 2 \\ &= 8\Omega \end{aligned}$$

The current in the circuit will be

$$\begin{aligned} i &= \frac{V}{R_{e_q}} \\ &= \frac{12}{8} \\ &= 1.5\text{A} \end{aligned}$$

The voltage across the capacitor is same as that across the 2Ω resistor as no current is flowing through the 9Ω resistor. Hence

$$\begin{aligned} V &= 1.5 \times 2 \\ &= 3\text{V} . \end{aligned}$$

ANSWER

(A)

CONTRIBUTOR

This question of the day was provided by the courtesy of Professor [Autar Kaw](#) of the [University of South Florida](#) from the book [Fundamentals of Engineering Examination Sample Questions General Engineering](#).