

1. In an RC circuit, $\varepsilon = 6\text{ V}$, $R = 2000\ \Omega$ and $C = 4\text{ mF}$. What is the time constant?

- A) 0.5 s
- B) 1.5 s
- C) 2 s
- D) 8 s
- E) 12 s

2. In an RC circuit the time constant is the amount of time that it takes for the capacitor to become charged to what percent?

- A) 25 %
- B) 50 %
- C) 63 %
- D) 86 %
- E) 100 %

3. Which of the following is the equation for the amount of charge on the capacitor in an RC circuit after the switch is closed?

- A) $Q(t) = C\varepsilon(1 - e^{-t/RC})$
- B) $Q(t) = C\varepsilon(1 + e^{-t/RC})$
- C) $Q(t) = C\varepsilon e^{-t/RC}$
- D) $Q(t) = \varepsilon(e^{-t/RC} - 1)$
- E) $Q(t) = \varepsilon e^{-t/RC}$

4. What does Q approach as $t \rightarrow \infty$ in an RC circuit after the switch is closed?

- A) Zero
- B) ε/R
- C) εR
- D) $C\varepsilon$
- E) RC

5. What does I approach as $t \rightarrow \infty$ in an RC circuit after the switch is closed?

- A) Zero
- B) $C\varepsilon$
- C) ε/R
- D) εR
- E) RC

6. The switch in an RC circuit is initially closed. After it is opened, what does Q approach as $t \rightarrow \infty$?

- A) Zero
- B) C
- C) ε/R
- D) εR
- E) RC

7. The switch in an RC circuit is initially closed. After it is opened, what does I approach as $t \rightarrow \infty$?

- A) Zero
- B) C
- C) ε/R
- D) εR
- E) RC

8. The switch in an RC circuit is initially closed. Immediately after it opens, which of the following is the equation for the amount of charge on the capacitor in an RC circuit?

A) $Q(t) = C\varepsilon(1 - e^{-t/RC})$

B) $Q(t) = C\varepsilon(1 + e^{-t/RC})$

C) $Q(t) = C\varepsilon e^{-t/RC} + 1$

D) $Q(t) = C\varepsilon(e^{-t/RC} - 1)$

E) $Q(t) = C\varepsilon e^{-t/RC}$

9. A circuit consists of a voltage source V , a resistor R , and a capacitor C . If a switch in the circuit is initially open, about how long after the switch is closed does it take for the capacitor to be 63% charged?

A) V/R

B) V/C

C) VC

D) R/C

E) RC

Answer Key
Energy in Capacitor Circuits [Mar 28, 2011]

1. D
 2. C
 3. A
 4. D
 5. A
 6. A
 7. A
 8. E
 9. E
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Name _____

Class _____

Date _____

1. _____

2. _____

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