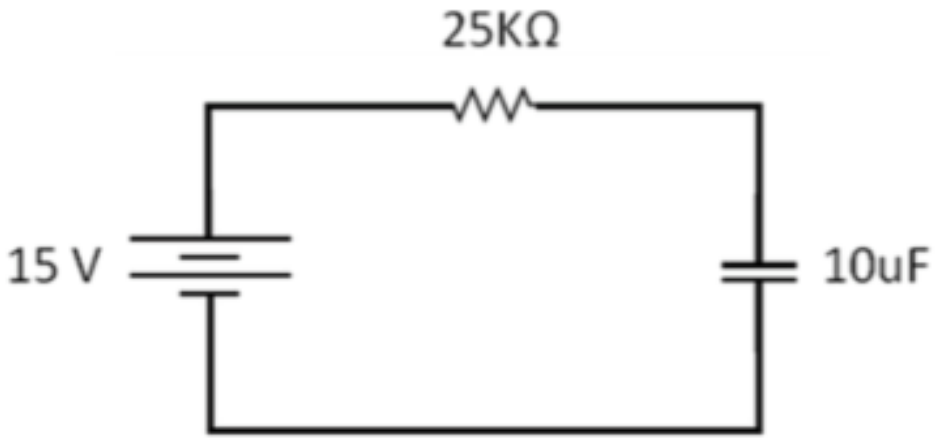
Basic Electricity – Unit 11: Capacitance

Test 2 – RC Test

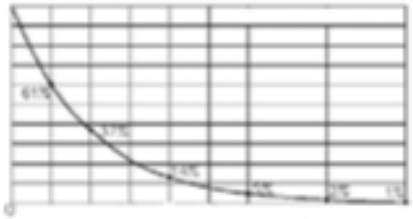
Use the following circuit and calculate problems 1-5.



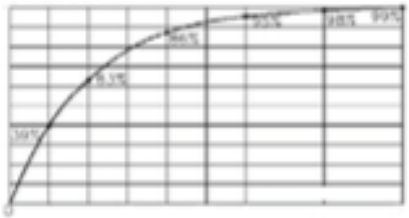
1. What is 1 time constant equal to? _____

2. Which of the following graphics show the voltage charging across the capacitor?

A)



B)



3. Use the given circuit and graphics. What will the voltage across the capacitor be after 2 time constants?

   _____

4. How much current flows in the circuit at the instant the switch is closed?

   _____

5. Once the capacitor is fully charged, how much current flows in the circuit?

   _____

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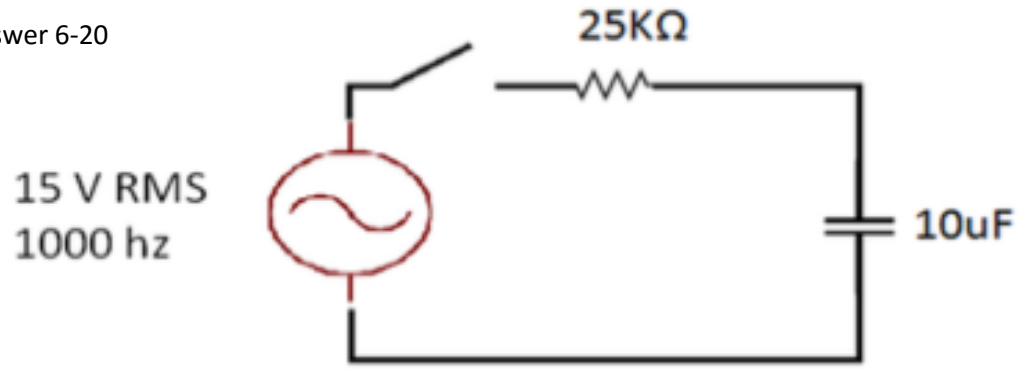
Use the following circuit to answer 6-20



6. What is Xc? _____
7. What is Z? _____
8. What is R? _____
9. What is Vt? _____
10. What is VR? _____
11. What is VXc? _____
12. What is the power consumed by the resistor? _____
13. What is the power consumed by Xc? _____
14. What is the value of theta? _____
15. What is the total power? _____
16. What is the phase angle? _____
17. What are the units of power for resistance? _____
18. What are the units of power for Xc? _____
19. What are the units of power for total power? _____
20. What is the total current? _____

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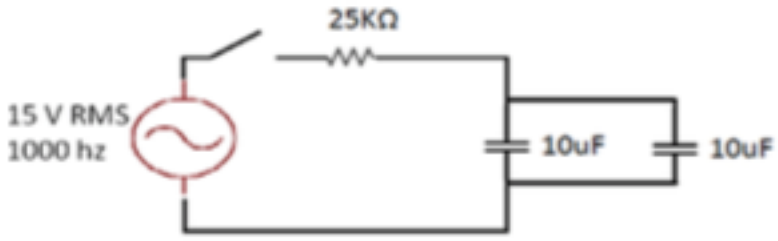
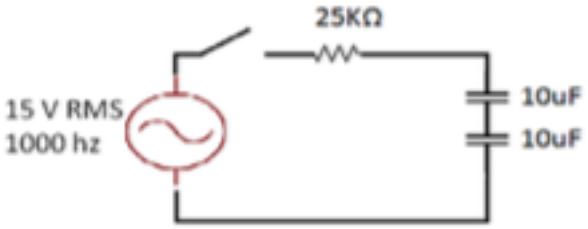
21. What is Xc of the following circuit? _____



22. What is Xc of the following circuit? _____



23. Which of the following are true?
    a) C = V/Q
    b) C = 1/V
    c) Q = 1/C
    d) Q = CV
    e) None of these

24. Capacitors allow AC current to flow?
    a) true
    b) false

25. Capacitors allow DC current to flow after the capacitor is charged?
    a) true
    b) false

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Answers:

1. What is 1 time constant equal to? **250 milli seconds**
2. Which of the following graphics show the voltage charging across the capacitor? **B**
3. Use the given circuit and graphics.
   What will the voltage across the capacitor be after 2 time constants? **12.9 volts**
4. How much current flows in the circuit at the instant the switch is closed? **.0006 A = .6 mA = 600 uA**
5. Once the capacitor is fully charged, how much current flows in the circuit? **0 amps**
6. What is Xc? **Xc = 15.916 Ω**
7. What is Z? **Z = 25000.00507 Ω**
8. What is R? **25000 Ω**
9. What is Vt? **15 V**
10. What is VR? **14.99999696 V**
11. What is VXc? **VXc = .009549598 V**
12. What is the power consumed by the resistor? **P true = .008999996 watts**
13. What is the power consumed by Xc? **PR = 00000573 VARS**
14. What is the value of theta? **Φ = .03647678°**
15. What is the total power? **Papparent = .008999998 VA**
16. What is the phase angle? **Φ = .03647678°**
17. What are the units of power for resistance? **Watts**
18. What are the units of power for Xc? **Volt Amp Reactance = VARS**
19. What are the units of power for total power? **VA = Volt Amps**
20. What is the total current? **It = .0006 Amps**
21. What is Xc of the following circuit? **7.957747 Ω**
22. What is Xc of the following circuit? **31.8309886 Ω**
23. Which of the following are true? **d) Q = CV**
24. Capacitors allow AC current to flow? **a) true**
25. Capacitors allow DC current to flow after the capacitor is charged? **b) false**

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