

# ENGG104 Tutorial 6 extra Problems (revision)

Name \_\_\_\_\_

Student Number \_\_\_\_\_

**SHORT ANSWER.** Write the word or phrase that best completes each statement or answers the question.

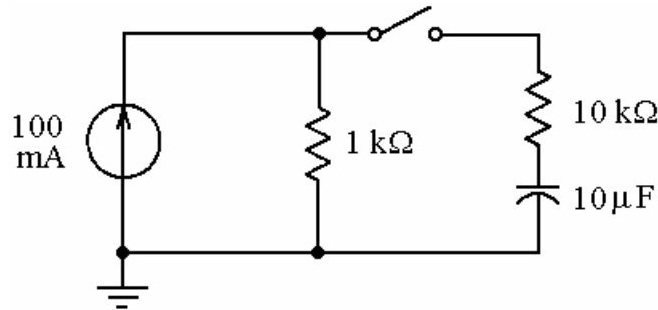


Figure 10.7

- 1) See Figure 10.7. After the switch closes, what is the final voltage reached across the  $10\ \mu\text{F}$  capacitor? 1) \_\_\_\_\_

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

- 2) Which of the following describes the action of a capacitor? 2) \_\_\_\_\_
- A) Converts ac into dc                      B) Creates a dc resistance
- C) Opposes changes in the flow of current                      D) Stores electrical energy

**TRUE/FALSE.** Write 'T' if the statement is true and 'F' if the statement is false.

- 3) A capacitor has a capacitance of 1 farad if 1 coulomb of charge is deposited on the plates by a potential difference of 1 volt across the plates. 3) \_\_\_\_\_
- 4) When breakdown occurs in a capacitor, the capacitor will display the same characteristics as an open circuit. 4) \_\_\_\_\_
- 5) Similar to resistors, when you want to increase capacitance, you would connect them in series. 5) \_\_\_\_\_

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

- 6) What is the charge on a  $500\ \text{pF}$  capacitor with 50 volts applied? 6) \_\_\_\_\_
- A)  $2.5\ \text{nC}$                       B)  $.025\ \text{C}$                       C)  $25\ \text{nC}$                       D)  $.25\ \text{nC}$

**SHORT ANSWER.** Write the word or phrase that best completes each statement or answers the question.

- 7) What is the time constant of a network that contains a 1 microfarad capacitor in series with a 1 Kilohm resistor? 7) \_\_\_\_\_

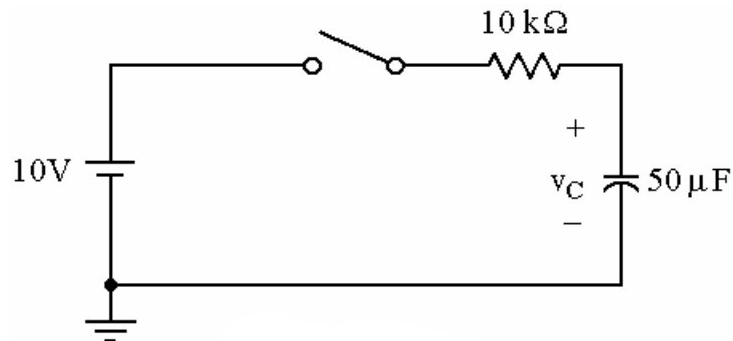
**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 8) Which type of capacitor is used in applications requiring several thousand microfarads of capacitance? 8) \_\_\_\_\_  
A) electrolytic                      B) polyester                      C) ceramic                      D) mica

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

- 9) The ideal capacitor completely dissipates all energy supplied to it. 9) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**



**Figure 10.1**

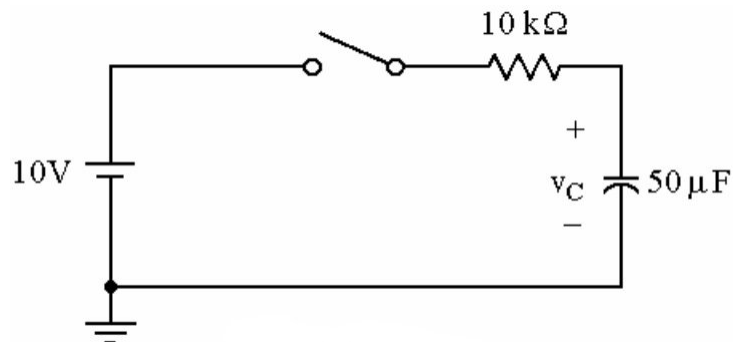
- 10) See Figure 10.1. If the initial voltage of the capacitor = 0V, what is the maximum instantaneous current that will flow through the capacitor after the closing of the switch? 10) \_\_\_\_\_  
A) 1 mA                      B) 200 kA                      C) 5  $\mu\text{A}$                       D) infinity

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

- 11) Permittivity is measured in farads per meter. 11) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 12) How long will it take for a  $2.2\text{ }\mu\text{F}$  capacitor to charge when connected in series with a 820 ohm resistor to a 25 volt source? 12) \_\_\_\_\_  
A) 1.8 ms                      B) 18 ms                      C) 180 ms                      D) .18 ms



**Figure 10.1**

- 13) See Figure 10.1. What is the time constant  $\tau$  for this circuit? 13) \_\_\_\_\_  
A) 5 ms                      B) 50 ms                      C) 5 s                      D) 500 ms

- 14) Two capacitors are placed in series, what is their equivalent capacitance if the value of one capacitor is 1 microfarad and the value of the other capacitor is 3 microfarads? 14) \_\_\_\_\_  
 A) 75 microfarads B) 0.75 millifarads  
 C) 0.75 microfarads D) 7.5 microfarads
- 15) What is the capacitance of a capacitor if  $10 \mu\text{C}$  of charge are present when 100 V are applied across its plates? 15) \_\_\_\_\_  
 A)  $10^7 \mu\text{F}$  B)  $10 \mu\text{F}$  C)  $1000 \mu\text{F}$  D)  $0.1 \mu\text{F}$

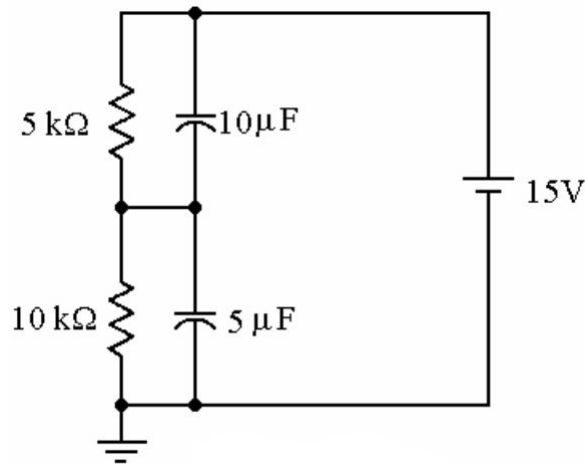


Figure 10.5

- 16) See Figure 10.5. What is the voltage across the  $5 \mu\text{F}$  capacitor after each capacitor has charged to its final value? 16) \_\_\_\_\_  
 A) 0 V B) 5 V C) 15 V D) 10 V

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

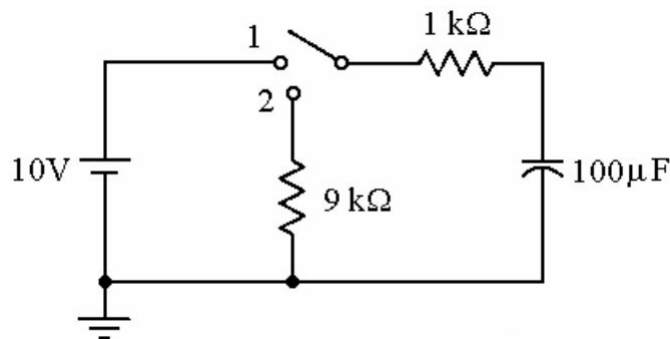


Figure 10.8

- 17) See Figure 10.8. Assume that the capacitor has charged to  $v_C = 6 \text{ V}$ . How long will it take for the capacitor to discharge to  $v_C = 4 \text{ V}$  after the switch is thrown to position 2? 17) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 18) What is the total capacitance of three capacitors connected in parallel with values of  $2.2 \mu\text{F}$ ,  $6 \mu\text{F}$  and  $3.2 \mu\text{F}$ ? 18) \_\_\_\_\_  
 A)  $.107 \mu\text{F}$  B)  $114 \mu\text{F}$  C)  $11.4 \mu\text{F}$  D)  $1.07 \mu\text{F}$

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

19) The insulating material between the capacitor plates is called a conductor. 19) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

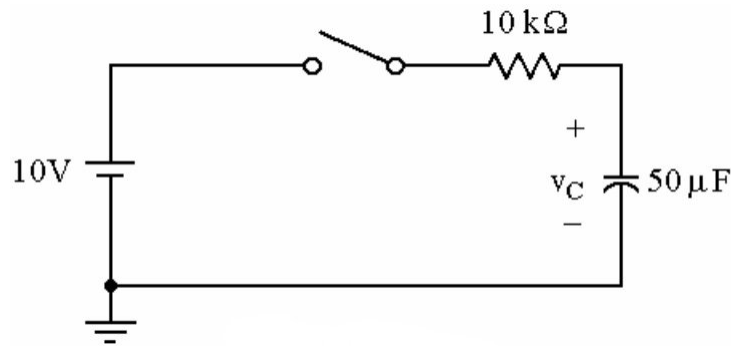
20) What is the value of a capacitor with 250 volts applied and 500 pC of charge? 20) \_\_\_\_\_  
A) 2 pF                      B) 200  $\mu$ F                      C) .5 pF                      D) 500  $\mu$ F

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

21) An ideal capacitor looks like an open circuit to dc current once it has charged to its final value. 21) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

22) The type of capacitance that results not by design, but because two conducting surfaces are in close proximity to each other is called 22) \_\_\_\_\_  
A) variable capacitance.                      B) stray capacitance.  
C) electrolytic capacitance.                      D) tantalum capacitance.



**Figure 10.1**

23) See Figure 10.1. The voltage  $v_C$  will reach 99% of its maximum value after how much time has elapsed? 23) \_\_\_\_\_  
A) 1 time constant                      B) 5 time constants  
C) 50 time constants                      D) 50  $\mu$ s

24) What is the total capacitance of three capacitors connected in series with values of 2.2  $\mu$ F, 6  $\mu$ F and 3.2  $\mu$ F? 24) \_\_\_\_\_  
A) 1.07  $\mu$ F                      B) .107  $\mu$ F                      C) .92  $\mu$ F                      D) 11.4  $\mu$ F