

## ENGG104 Tutorial 6 Class Questions

Team Name: \_\_\_\_\_

## Question 1 [typical exam question]

For the circuit in Fig. 94, composed of standard values:

- Determine the time constant of the circuit.
- Write the mathematical equation for the voltage  $v_C$  following the closing of the switch.
- Determine the voltage  $v_C$  after one, three, and five time constants.
- Write the equations for the current  $i_C$  and the voltage  $v_R$ .
- Sketch the waveforms for  $v_C$  and  $i_C$ .

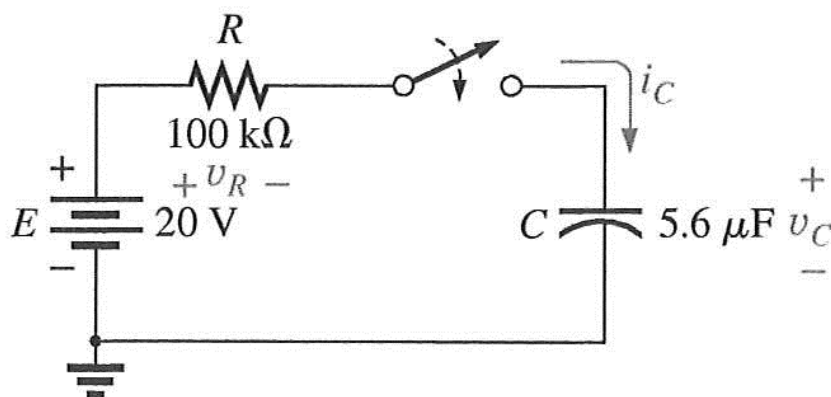
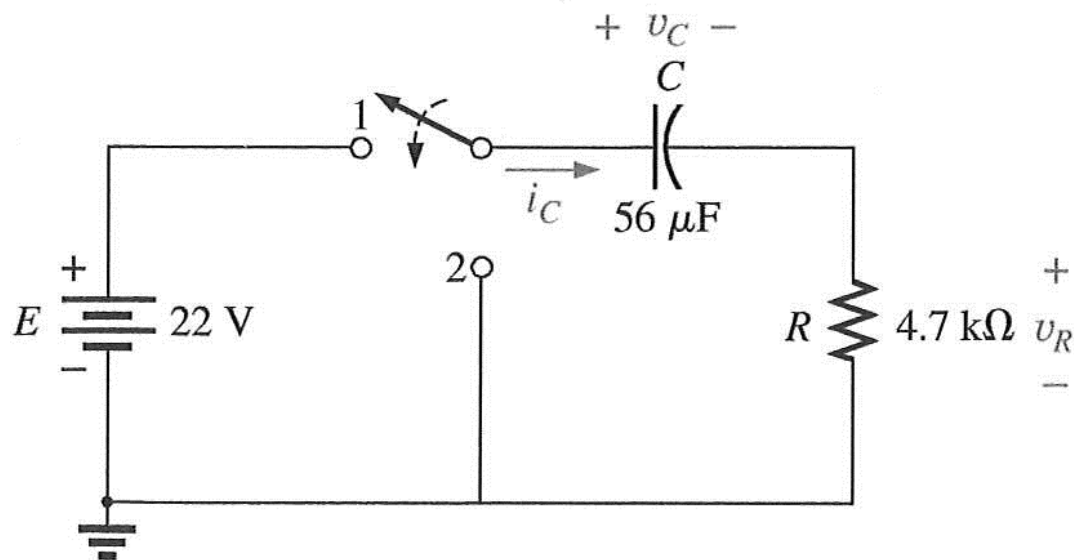


FIG. 94

**Question 2 [typical exam question]**

For the  $R$ - $C$  circuit in Fig. 97, composed of standard values:

- Determine the time constant of the circuit when the switch is thrown into position 1.
- Find the mathematical expression for the voltage across the capacitor and the current after the switch is thrown into position 1.



- c. Determine the magnitude of the voltage  $v_C$  and the current  $i_C$  the instant the switch is thrown into position 2 at  $t = 1$  s.
- d. Determine the mathematical expression for the voltage  $v_C$  and the current  $i_C$  for the discharge phase.
- e. Plot the waveforms of  $v_C$  and  $i_C$  for a period of time extending from 0 to 2 s from when the switch was thrown into position 1.

### Question 3

**26.** For the network in Fig. 98, composed of standard values:

- Write the mathematical expressions for the voltages  $v_C$ , and  $v_{R_1}$  and the current  $i_C$  after the switch is thrown into position 1.
- Find the values of  $v_C$ ,  $v_{R_1}$ , and  $i_C$  when the switch is moved to position 2 at  $t = 100$  ms.
- Write the mathematical expressions for the voltages  $v_C$  and  $v_{R_2}$  and the current  $i_C$  if the switch is moved to position 3 at  $t = 200$  ms.
- Plot the waveforms of  $v_C$ ,  $v_{R_2}$ , and  $i_C$  for the time period extending from 0 to 300 ms.

