Izmir Institute qf Technology
Elec. & Electronics Eng. Dep.
Circuit Lab.

First Order RC Circuits
Lab#5

Pre-lab

1- For the circuit in Fig. 5.1:
   a- Find the time constant τ.
   b- Let $V_S(t)$ be a square wave with amplitude of (0V-5V), and a period of 20τ. Find $V(t)$ and sketch it.

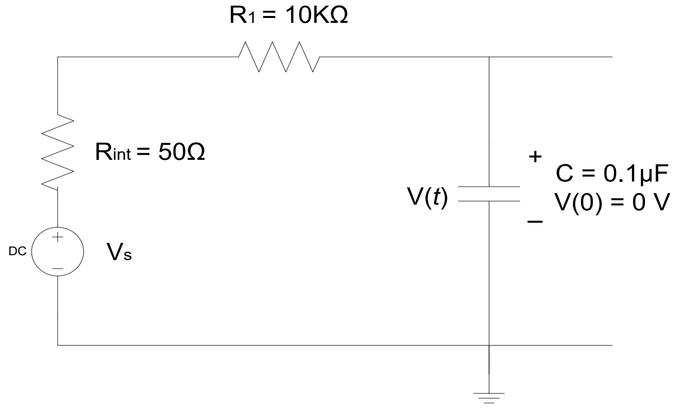
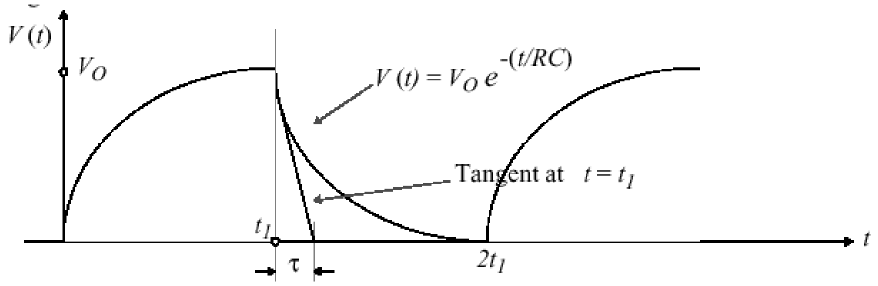


Fig. 5.1

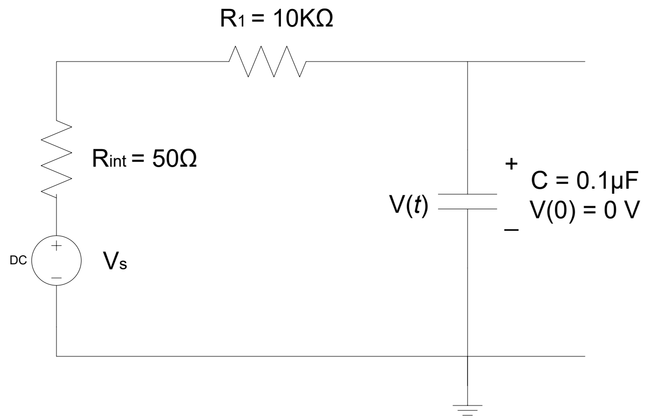
2- The ***tangent method*** to find τ: Sometimes it is convenient to be able to find the time constant of a circuit by just looking at its response on an oscilloscope. The response may look something like this:



- Show that τ in the above diagram is equal to RC.

Instructional objective
Two types of first order circuits will be considered in this lab; *RC* circuits and *RL* circuits.

Procedure:
1- Build the circuit in Fig. *5.1*.



2- Let *Vs (t)* be a square wave from (0-5V), with a period of 20τ. Note that such a square wave is an approximation of a *STEP* function. **Why?**

3- Sketch *V (t)* and *Vs (t)* on the same graph.

4- Find the time constant (τ) using the tangent method. Note that finding the time constant from the oscilloscope display is not accurate to the n^{th} degree, but you can get a very close and quick approximation. Be sure to expand the waveform as much as possible on your screen to get the most accurate measurement.