Fill out information below and attach this cover sheet to the FRONT of your HW.
If you do not (or enter incorrect information) you WILL loose 10 points on the HW.

NAME:_____
SID #:_____
Circle One: EE42 / EE100
If EE100, Lab Day:_____**,Time:**_____

EE 100

Homework # 13

L. Chua — Fall 2008

Issued : Nov. 21 — Due : Nov. 26 (Wednesday)

1. **26** The circuit shown in Fig. P6.26*a* is to be used as a time-base generator in an oscilloscope. The *v-i* characteristic of the nonlinear resistor is given in Fig. P6.26*b*.

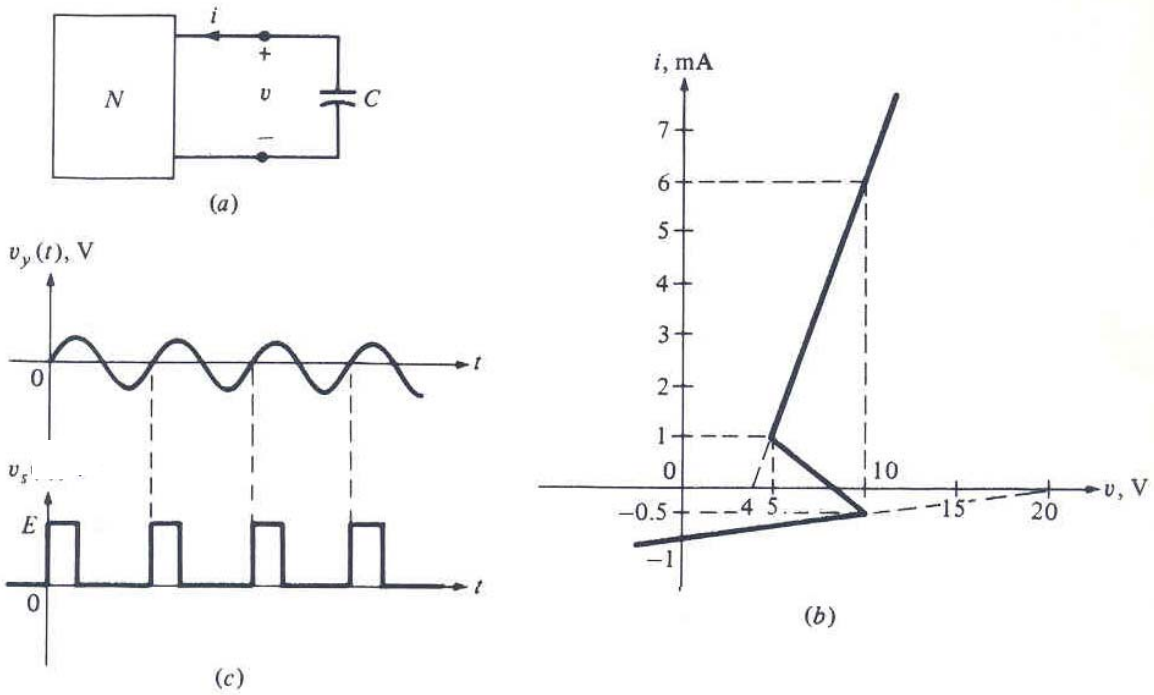

Figure P6.26

(*a*) Find C such that the frequency of oscillation is 1 kHz and sketch the waveform $v(t)$.

(*b*) It is desired to synchronize this time-base generator with a 1.1 kHz sine wave. To accomplish this a pulse train $v_s(t)$ is derived from the sine wave as shown in Fig. P6.26*c*. Indicate how $v_s(t)$ should be applied in order to synchronize $v(t)$ with $v_s(t)$. Assuming that E is of sufficient magnitude to accomplish switching instantaneously, sketch a typical dynamic route.

(*c*) What is the minimum magnitude for E that ensures synchronization?

2.

27 The circuit in Fig. P6.27 is to be used as a flip-flop. The v-i characteristic of the nonlinear resistor is given in Fig. P6.27b. In order to switch from Q_1 to Q_3 a triggering signal, Fig. P6.27c, is applied. Determine the minimum duration of the pulse required for successful switching.

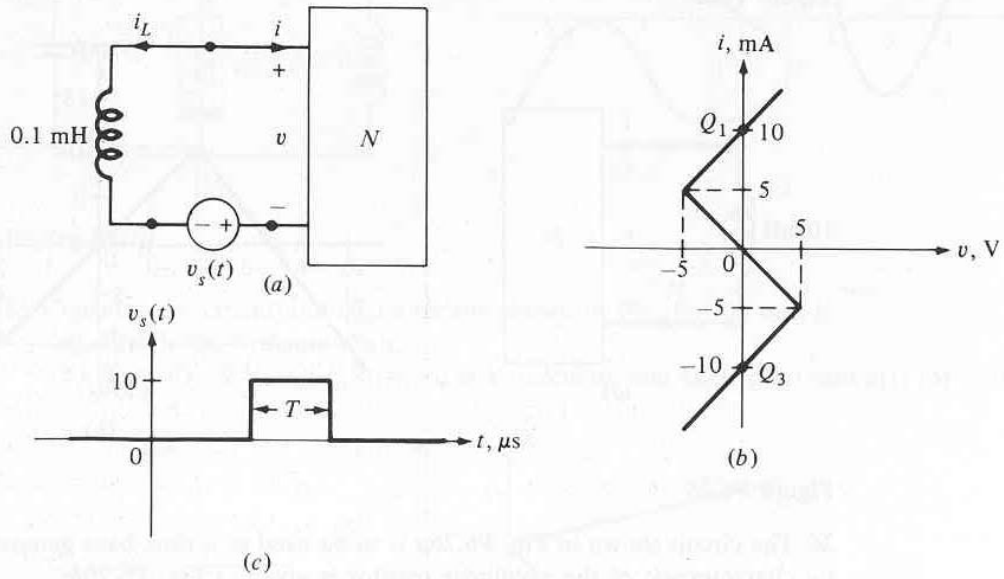

Figure P6.27

3. (*a*) Assuming the ideal op-amp model, find the v-i characteristic of the one-port to the right of terminals 1 and $1'$.

(*b*) Let $i_s(t) = 0$. Sketch the dynamic route and indicate all equilibrium points.

(*c*) If $v_C(0) = E_{sat}$ and with $i_s(t)$ as in Fig. P6.28b, find the conditions on I and T such that v_C eventually settles at $-E_{sat}$.

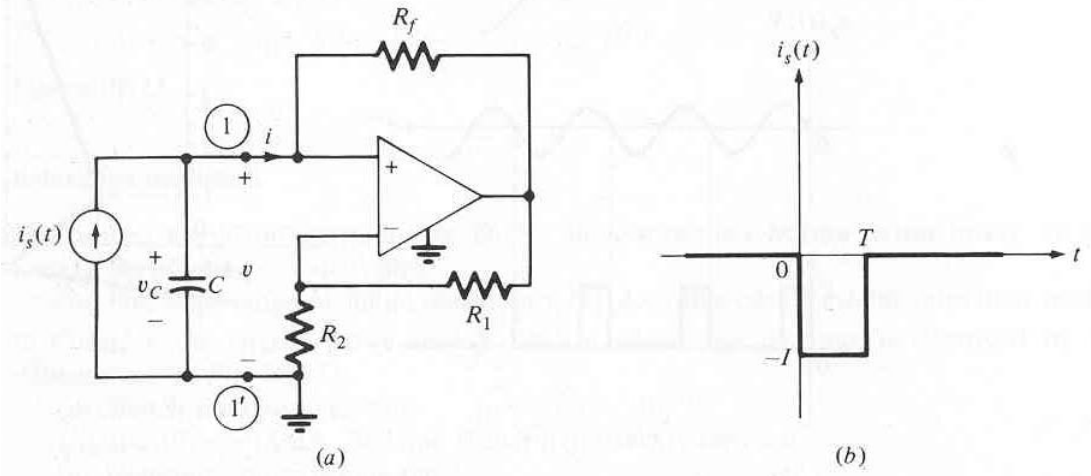

Figure P6.28

4. Do the assessment problem on page 346 of the textbook.