ECE 320 - Quiz #6 - Name ____________________

H Bridges, DC to DC Converters

H-Bridge Analysis:

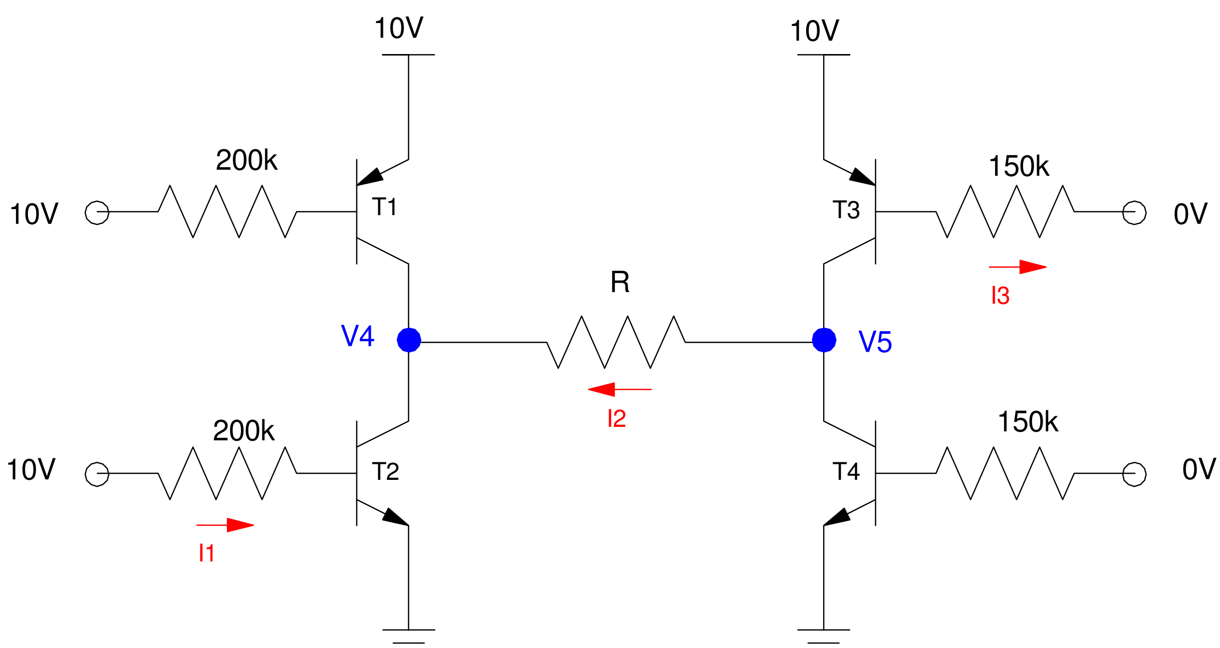
1) Determine the voltages and currents for the following H-bridge. Assume ideal transistors:

- |Vbe| = 0.7V
- |Vce| = 0.2V
- Current Gain = β = 40

Let R = 1000 + 100*(Birth Month) + Birth Day. May 14th would give R = 1514 Ohms.

Determine the voltages and currents

R	I1	I2	I3	V4	V5



H-Bridge Analysis:

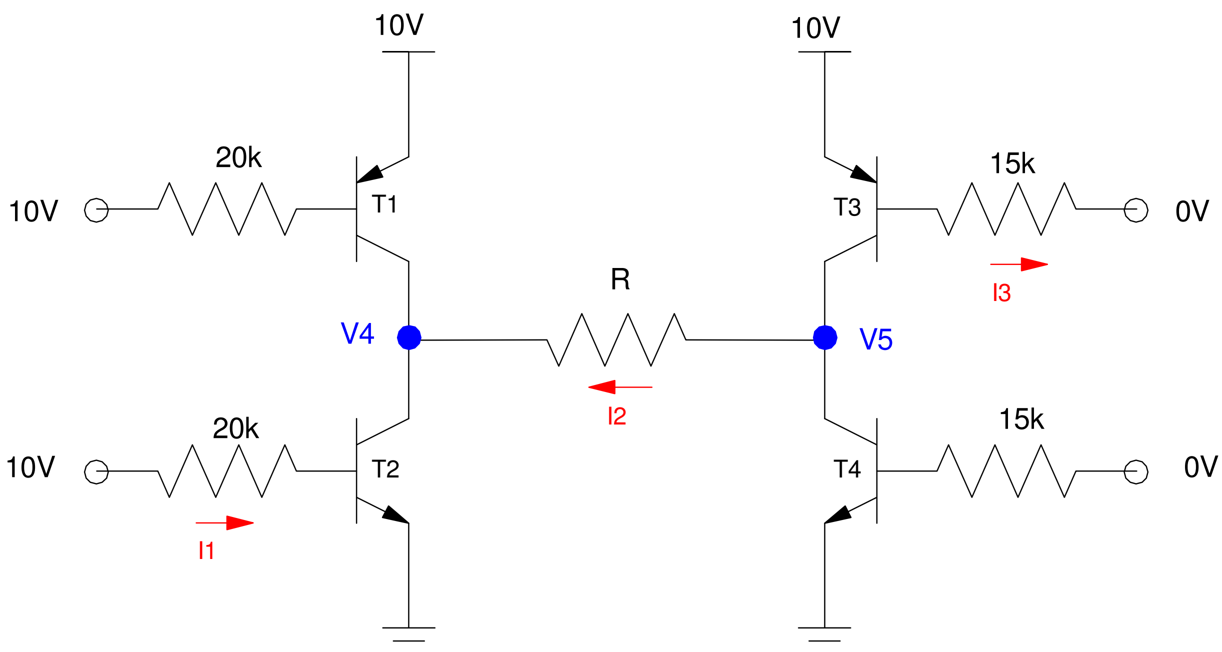
2) Determine the voltages and currents for the following H-bridge. Assume ideal transistors:

- $|V_{be}| = 0.7V$
- $|V_{ce}| = 0.2V$
- Current Gain = $\beta = 40$

Let R = 1000 + 100*(Birth Month) + Birth Day. May 14th would give R = 1514 Ohms.

Determine the voltages and currents

R	I1	I2	I3	V4	V5

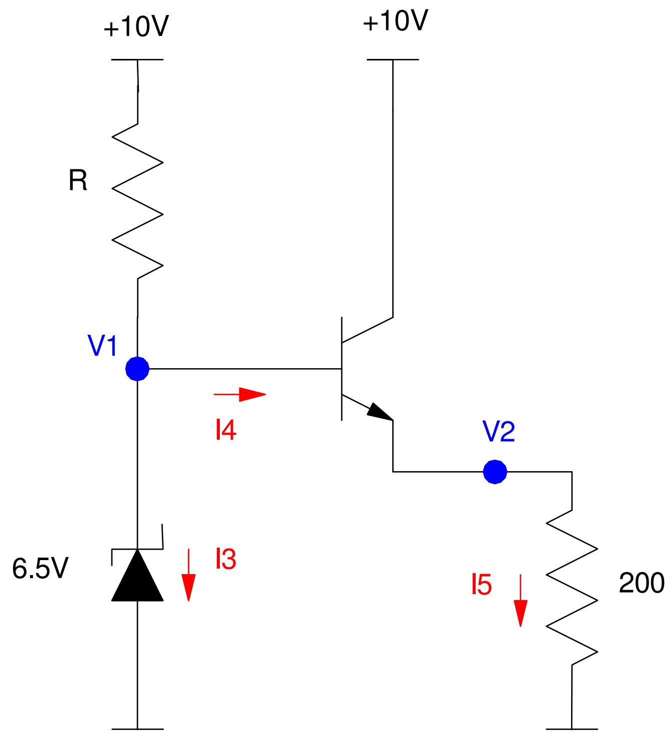


DC to DC Converter: (7805)

3) Determine the voltages and currents for the following DC to DC converter with a 6.5V zener diode. Assume

- $|V_{be}| = 0.7V$
- $|V_{ce(sat)}| = 0.2V$
- Current Gain = $\beta = 40$
- R = 1000 + 100*(Birth Month) + Birth Day. May 14th would give R = 1514 Ohms.

R	V1	V2	I3	I4	I5

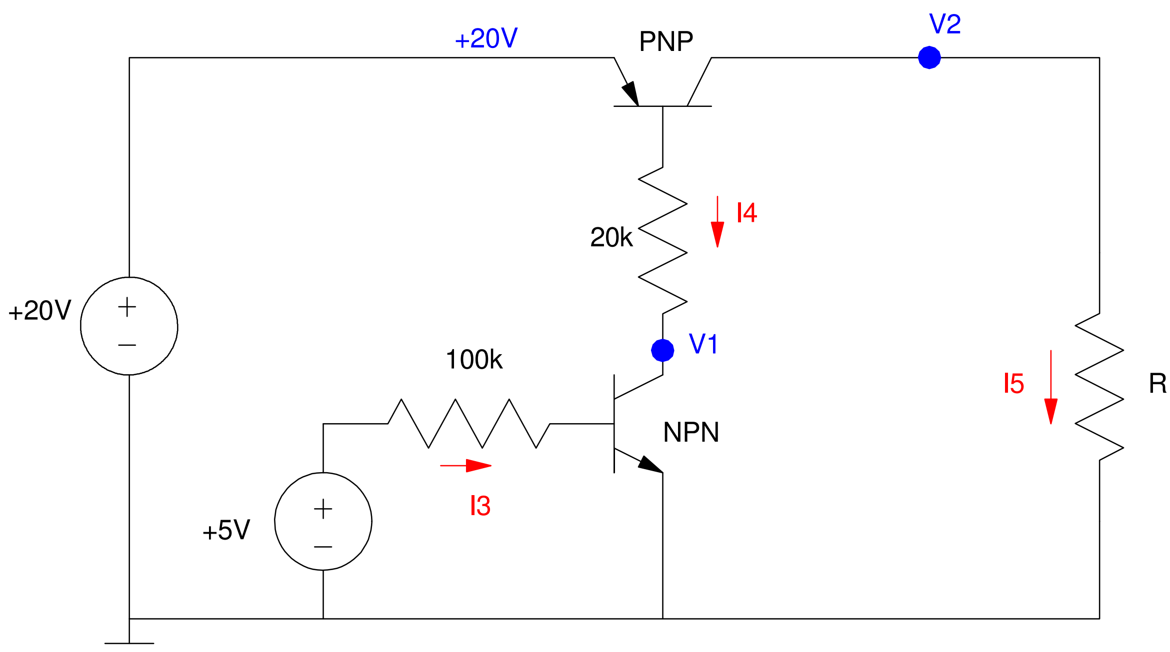


DC to DC Converter (take 2):

4) The following circuit implements the switch used on a Buck converter. Determine the voltages and currents. Assume

- |Vbe| = 0.7V
- |Vce(sat)| = 0.2V
- Current Gain = β = 40
- R = 1000 + 100*(Birth Month) + Birth Day. May 14th would give R = 1514 Ohms.

R	V1	V2	I3	I4	I5

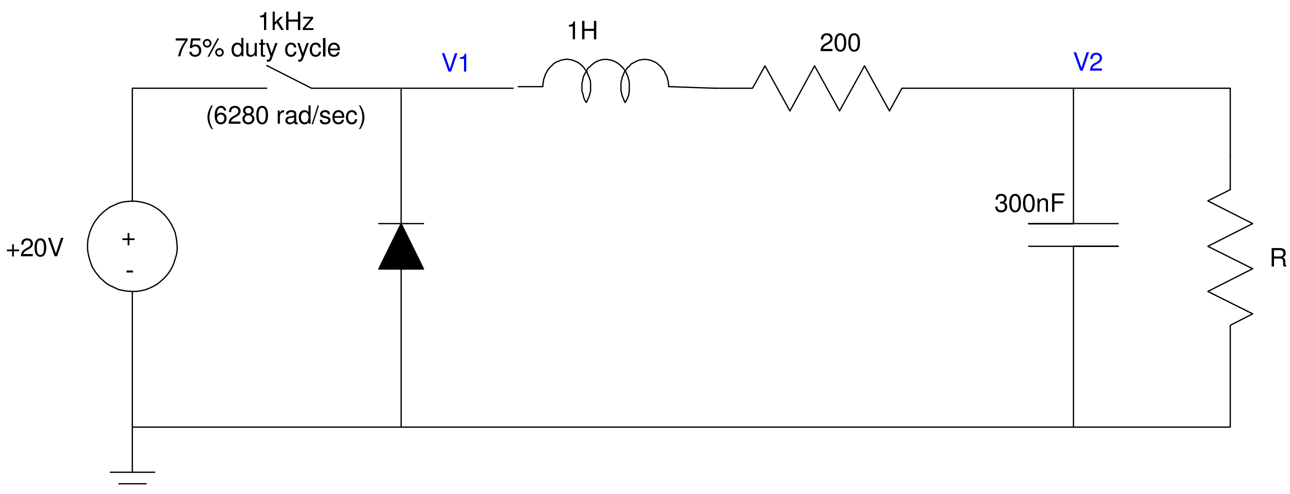


DC to DC Converter (take 3)

5) Determine the voltages at V1 and V2 (both DC and AC). Assume

- R = 1000 + 100*(Birth Month) + Birth Day. May 14th would give R = 1514 Ohms.

R	V1		V2	
	V1(DC)	V1(AC)	V2(DC)	V2(AC)

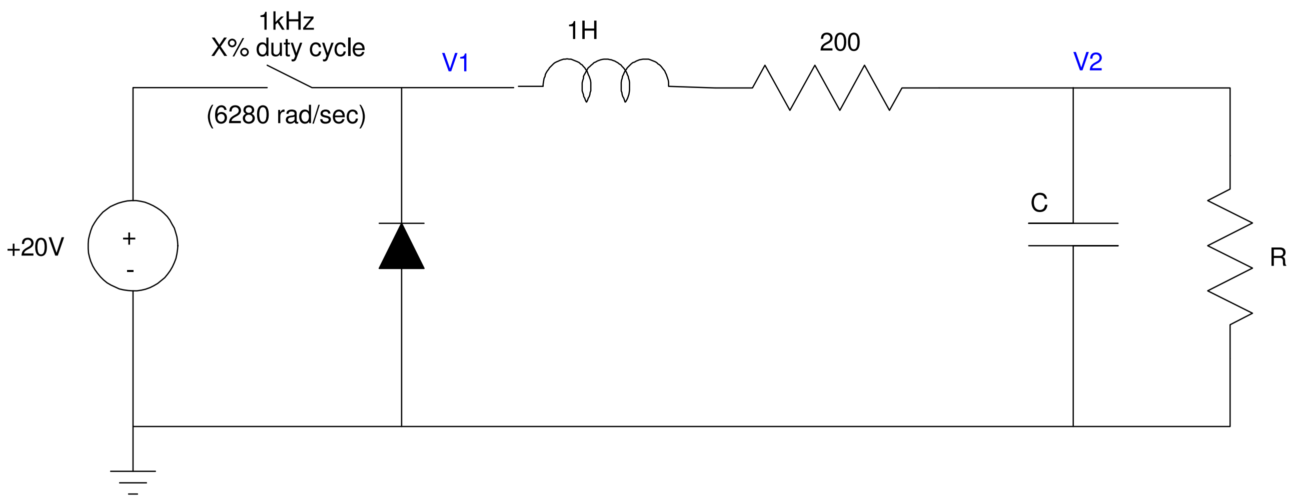


DC to DC Converter: Design

6) Determine the duty cycle and C so that

- V2(DC) is 7.50V
- V2(AC) = 1.00Vpp
- R = 1000 + 100*(Birth Month) + Birth Day. May 14th would give R = 1514 Ohms.

X% (duty cycle) V2(DC) = 7.50V	C V2(AC) = 1.00Vpp	R 1000 + 100*Mo + Day

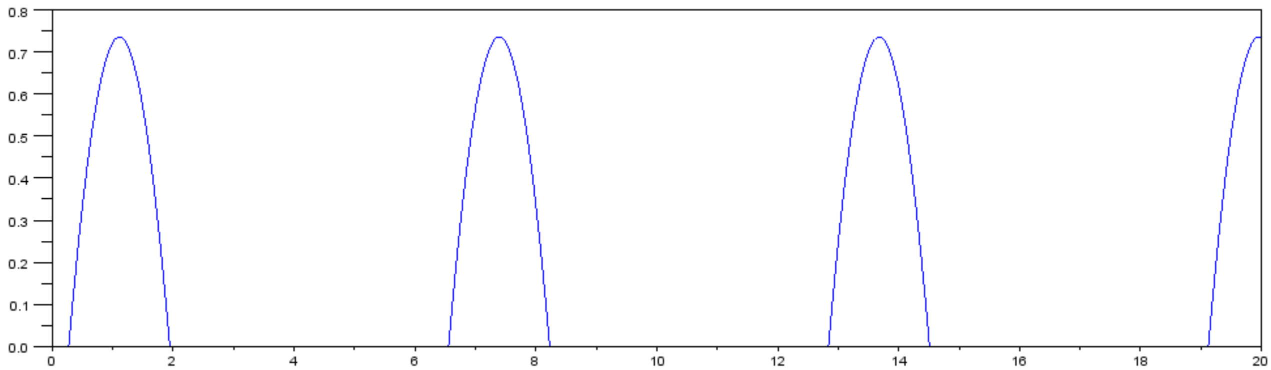


Fourier Transform

5) (Matlab recommended) Determine the DC term and the first two harmonics for the following waveform

$$x(t) = \max\left(0, 2\sin(t) + \cos(t) - 1.5\right)$$

$$x(t) \approx a_0 + a_1\cos(t) + b_1\sin(t) + a_2\cos(2t) + b_2\sin(2t)$$



Fourier Transform

6) Determine y(t) given that

$$x(t) = 10 + 9\cos(300t) + 8\sin(600t)$$