ECE 320 - Quiz #6 - Name _____

Spring 2023 - H Bridges, DC to DC, SCR, Fourier Transforms, Boolean Logic

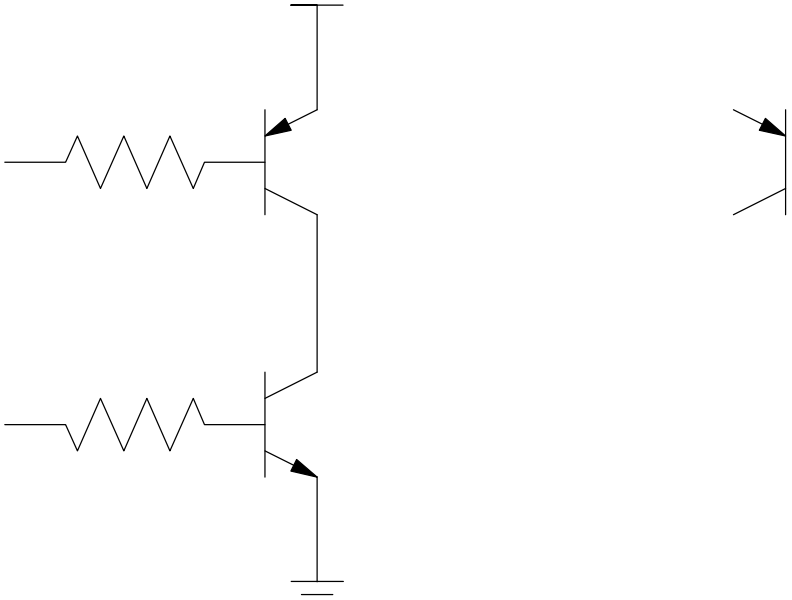
H-Bridge Analysis:

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

- | Vbe | = 0.7V
- | Vce | = 0.2V when saturated
- Current gain = β = 60

Let R = 800 + 100*(your birth month) + (your birth date)

R 800 + 100*mo + day	I1	I2	I3	V4	V5

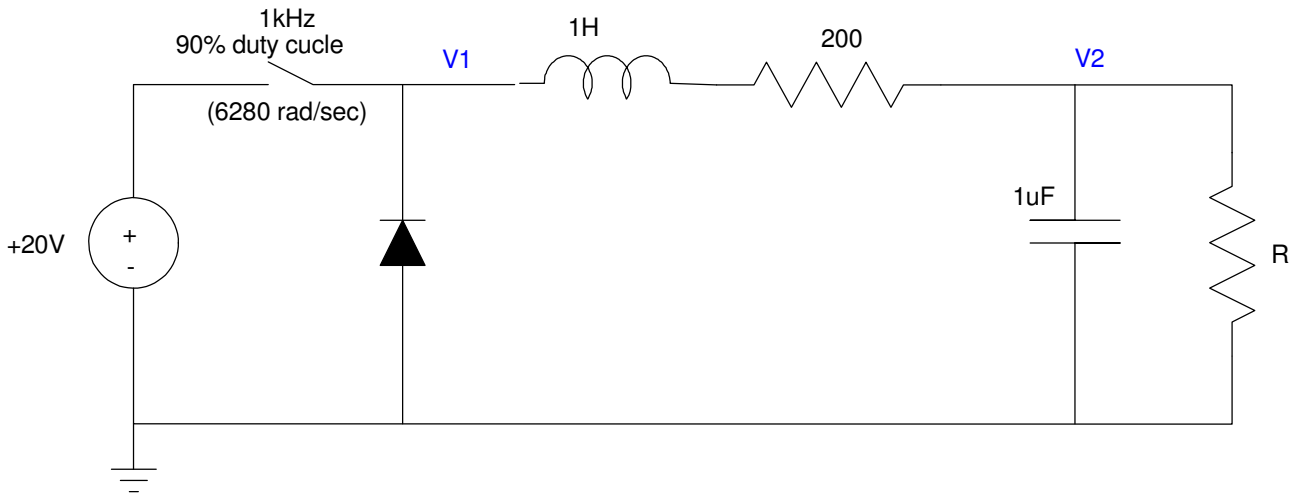


DC to DC Converter: Analysis

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

- R = 800 + 100*(your birth month) + (your birth date)

R 800 + 100*mo + day	V1		V2	
	DC	AC (V1pp)	DC	AC (V2pp)

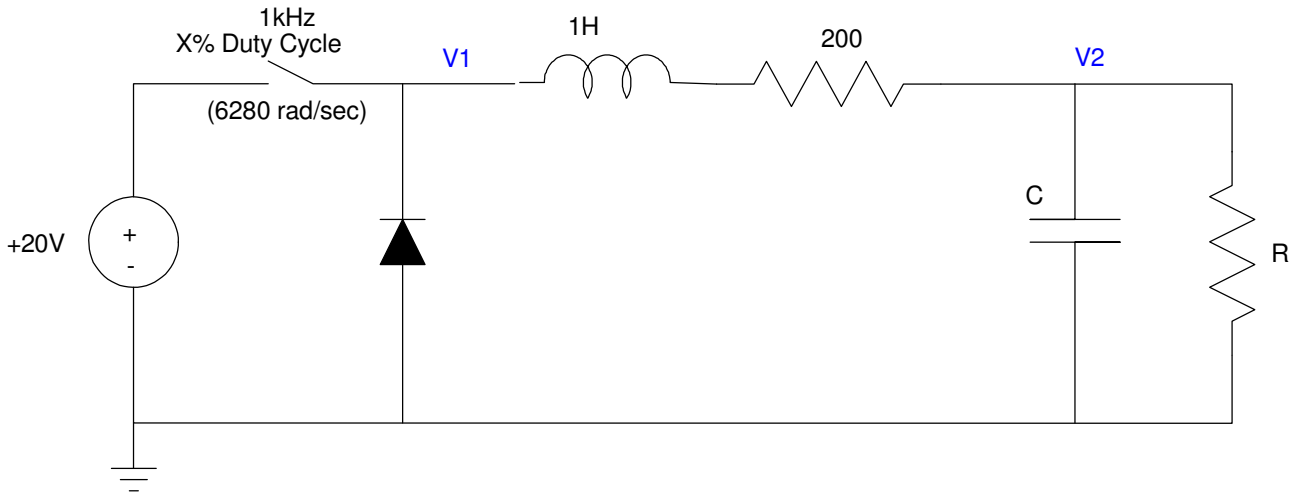


DC to DC Converter: Design

Determine the duty cycle and C so that

- V2(DC) is 11.0V and
- V2(AC) = 250mVpp
- R = 800 + 100*(your birth month) + (your birth date)

R 800 + 100*mo + day	Duty Cycle (X) %	C

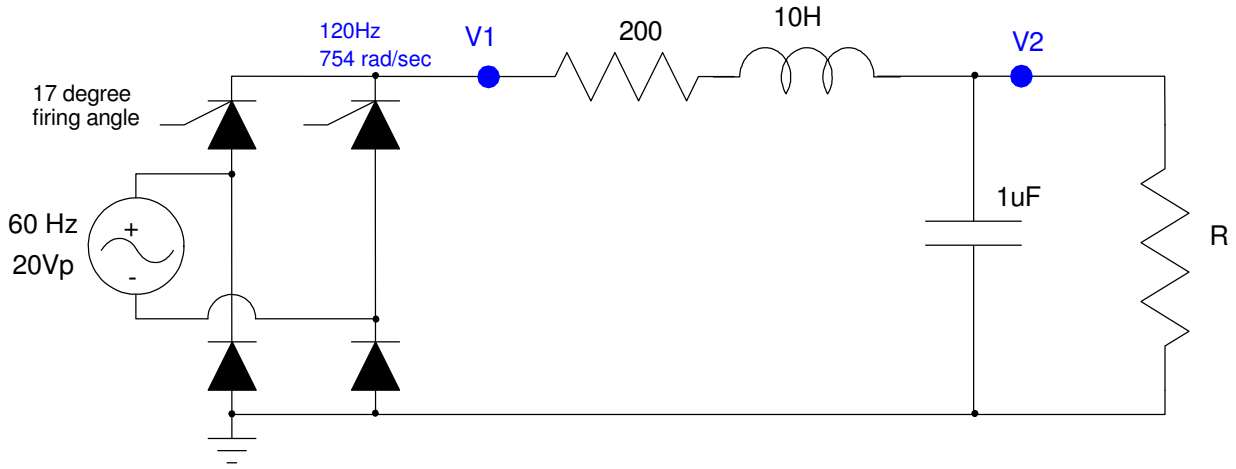


SCR

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

- R = 800 + 100*(your birth month) + (your birth date)
- 17 degree firing angle
- 20Vp 60Hz sine wave as the input

R 800 + 100*mo + day	V1		V2	
	DC	AC (V1pp)	DC	AC (V2pp)



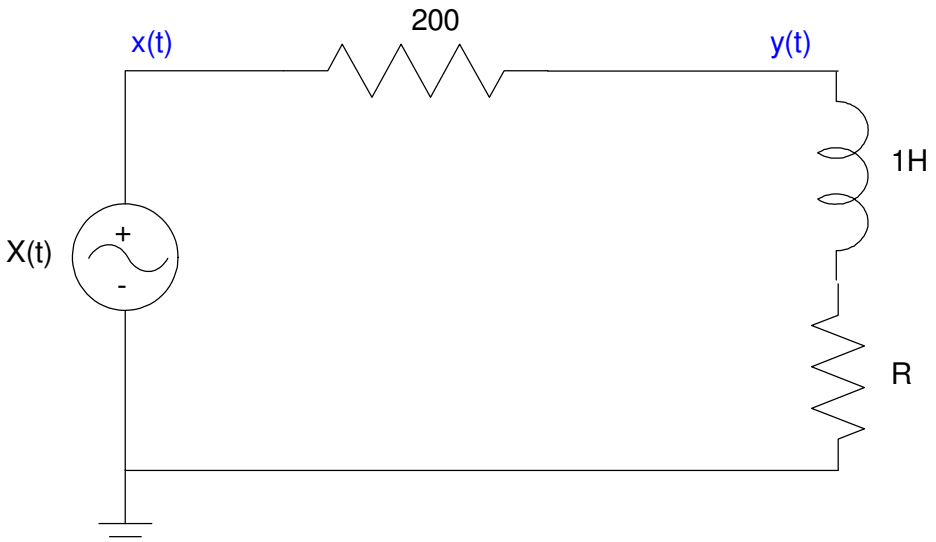
Fourier Transform

Determine y(t) given that

$$x(t) = 24 + 5\sin(50t) + 2\cos(100t)$$

- R = 800 + 100*(your birth month) + (your birth date)

R 800 + 100*mo + day	y(t)



Boolean Logic

Design a circuit using NOR gates to implement Y(A,B,C,D)

Y	CD			
	00	01	11	10
AB 00	x	0	1	1
AB 01	1	1	1	x
AB 11	x	x	0	0
AB 10	x	1	x	0