

ECE 320 - Quiz #6 - Name _____

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

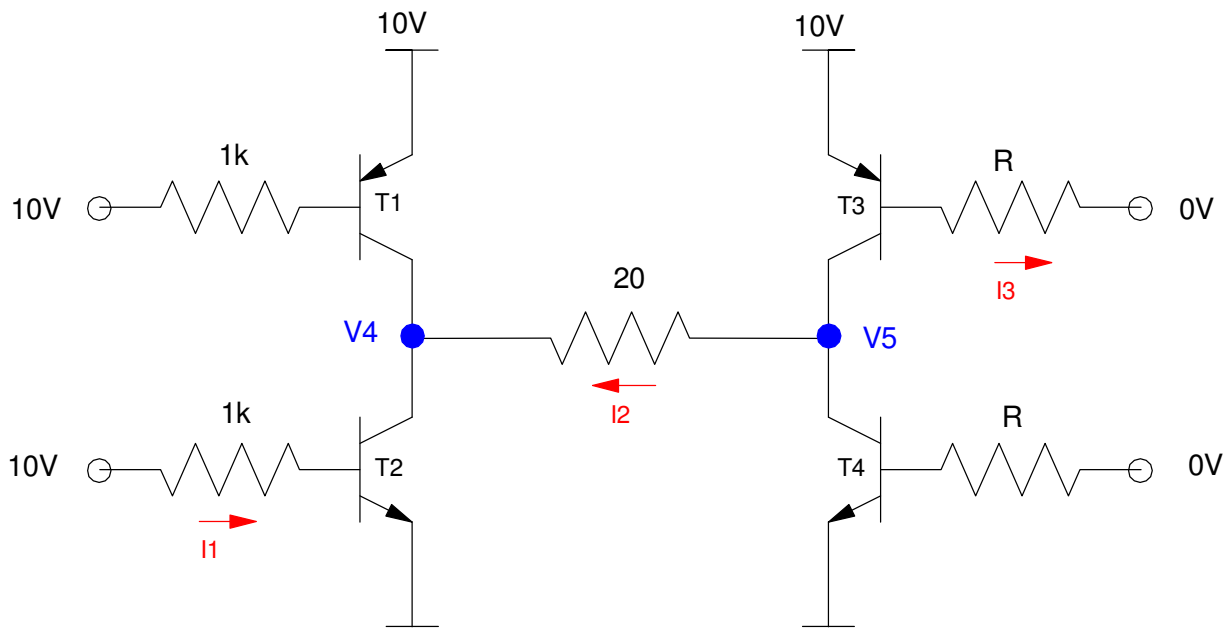
H-Bridge Analysis:

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

- $|V_{be}| = 0.7V$
- $|V_{ce}| = 0.2V$ when saturated
- Current gain = $\beta = 60$

Let $R = 800 + 100 * (\text{your birth month}) + (\text{your birth date})$

R	I1	I2	I3	V4	V5
$800 + 100 * \text{mo} + \text{day}$					

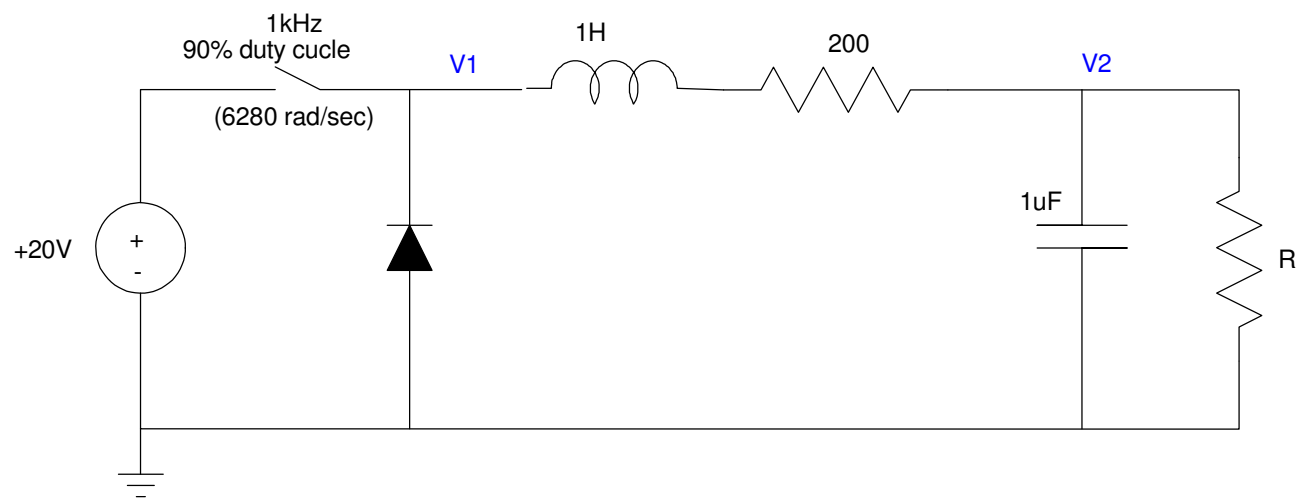


DC to DC Converter: Analysis

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

- $R = 800 + 100 \cdot (\text{your birth month}) + (\text{your birth date})$

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

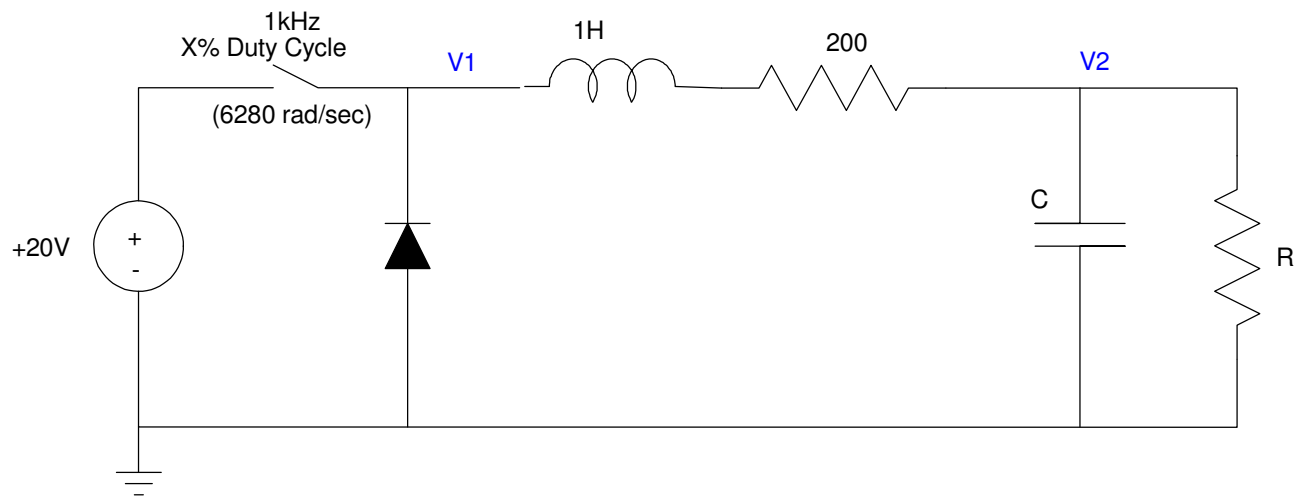


DC to DC Converter: Design

Determine the duty cycle and C so that

- V2(DC) is 11.0V and
- V2(AC) = 250mVpp
- $R = 800 + 100 \cdot (\text{your birth month}) + (\text{your birth date})$

R $800 + 100 \cdot \text{mo} + \text{day}$	Duty Cycle (X) %	C

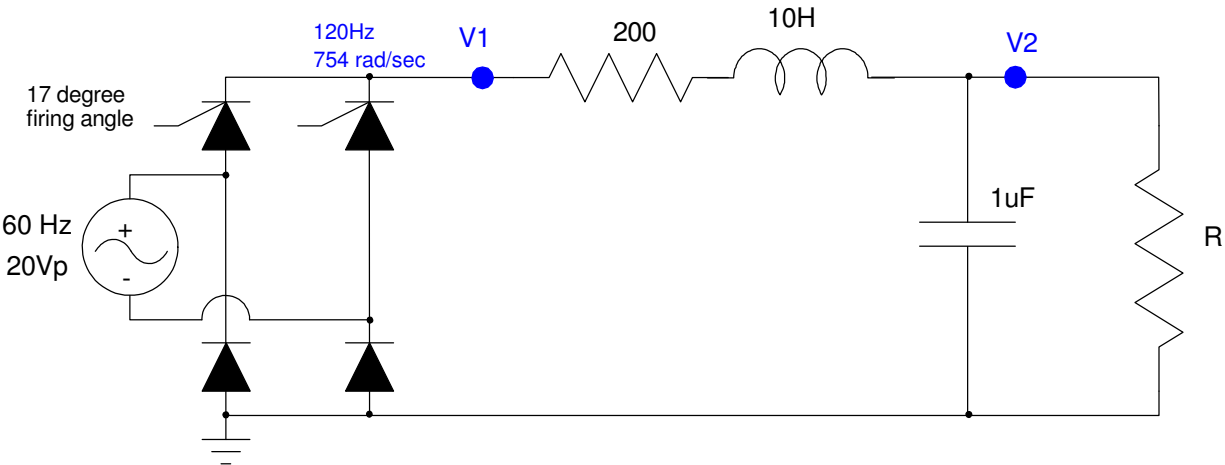


SCR

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

- $R = 800 + 100 \cdot (\text{your birth month}) + (\text{your birth date})$
- 17 degree firing angle
- 20Vp 60Hz sine wave as the input

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



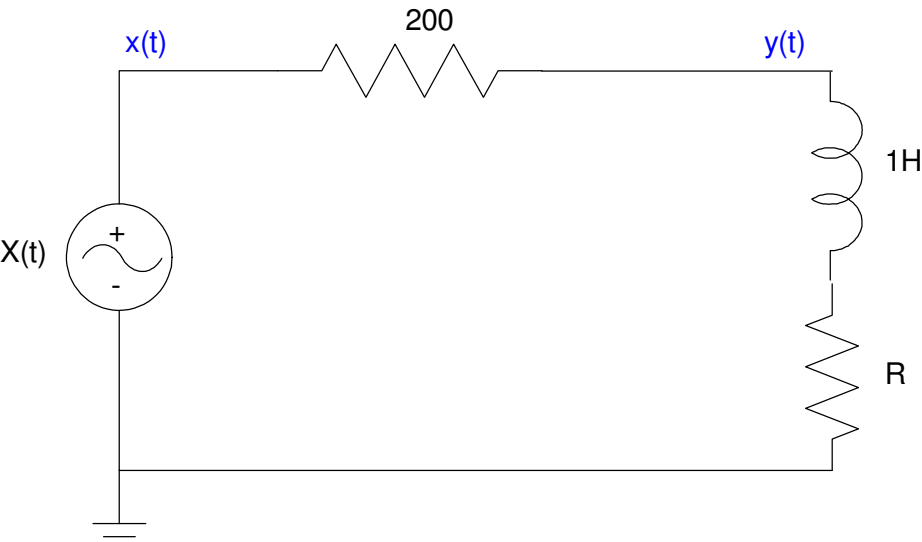
Fourier Transform

Determine $y(t)$ given that

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

- $R = 800 + 100 \cdot (\text{your birth month}) + (\text{your birth date})$

R $800 + 100 \cdot \text{mo} + \text{day}$	$y(t)$



Boolean Logic

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

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