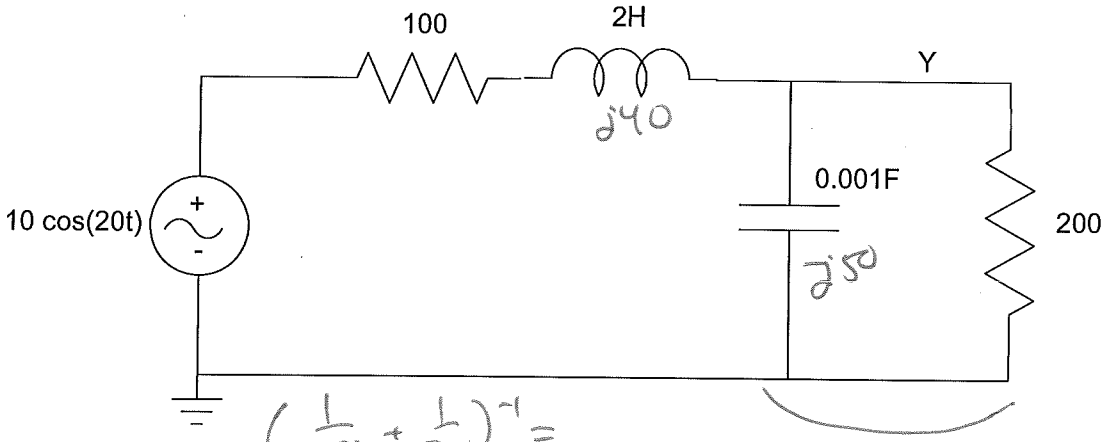
ECE 321: Quiz #3 Name _____

Phasors - November 17, 2016

$L \Rightarrow j\omega L$ $\quad C \Rightarrow \frac{1}{j\omega C}$ $\quad a\cos(\omega t) + b\sin(\omega t) \Rightarrow a - jb$

) Determine the phasor representation for the following:

Phasor Representation of....			
Vin = 10 cos(20t)	2H Inductor	0.001F Capacitor	Y
10	j40	-j50	1.313 - j4.127 4.33 ∠-72°



$\left(\frac{1}{j50} + \frac{1}{200}\right)^{-1} =$

$11.76 - j47.05$

$$\left(\frac{(11.76 - j47.05)}{(11.76 - j47.05) + (100 + j40)}\right) \cdot 10 = 1.$$

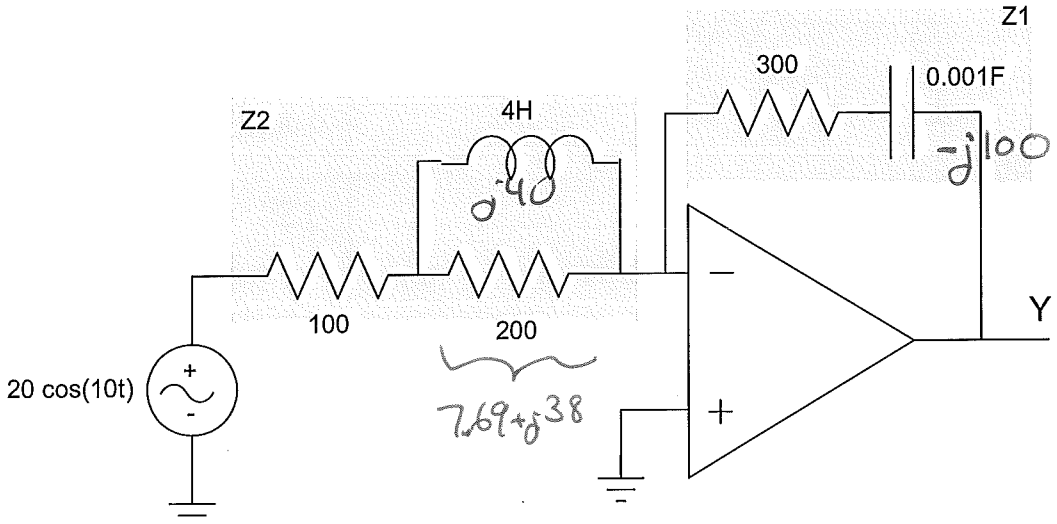
$$= 1.313 - j4.127$$

2) The gain of an inverting amplifier is

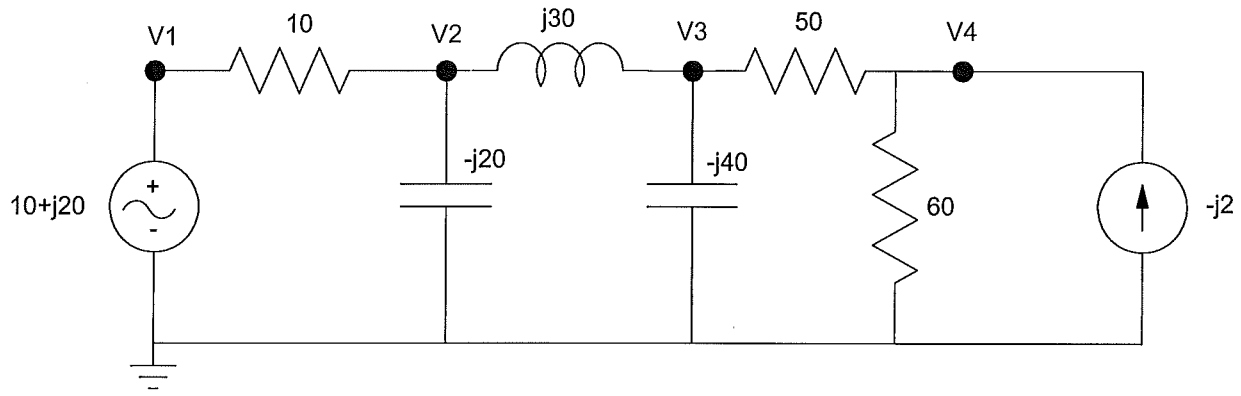
$$Y = -\frac{Z_1}{Z_2}$$

Determine the phasor representation of...

Phasor Representation of....			
Vin = 20 cos(10t)	Z2	Z1	$Y=-\left(\frac{Z_1}{Z_2}\right)V_{in}$
20	107.69+j38.46	300-j100	-.529+j1.117 1.236∠115°



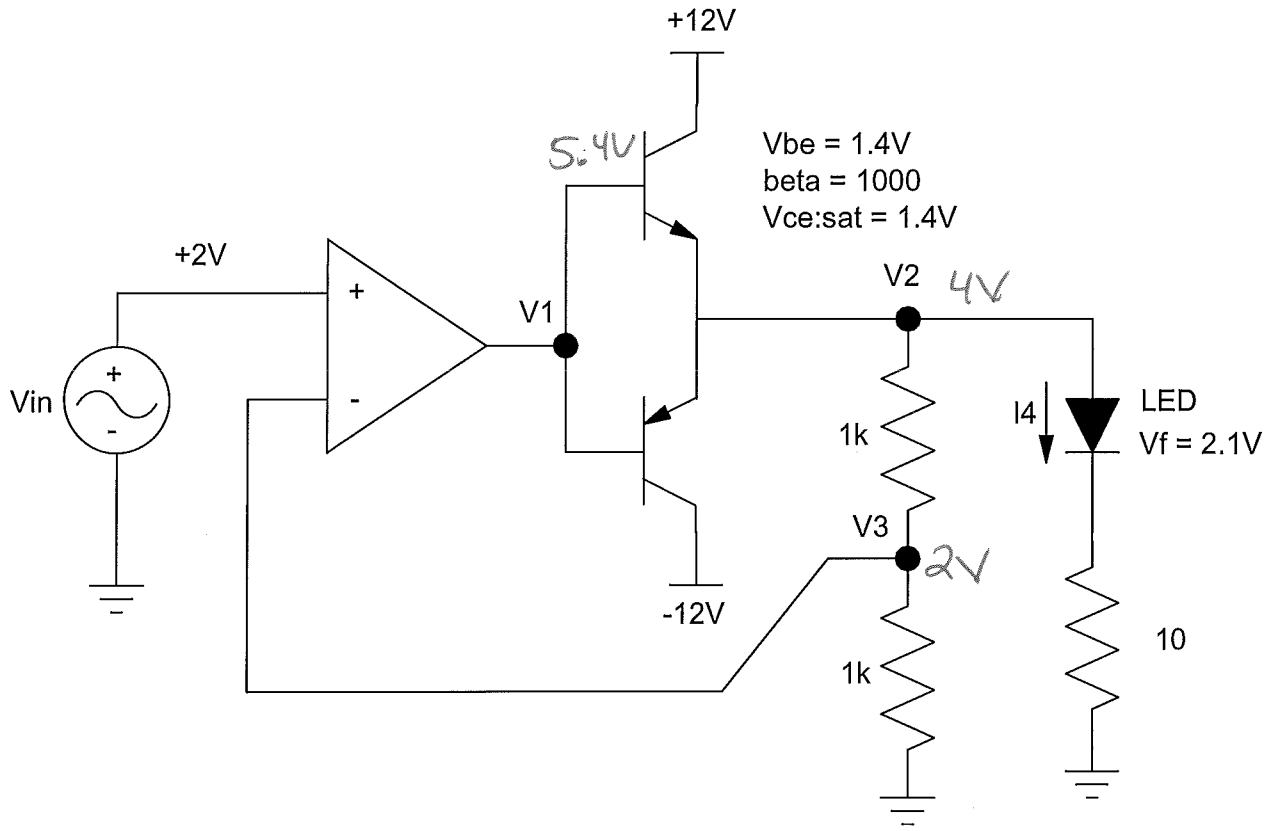
3) Write the voltage node equations for the following circuit using phasor notation (the phasor representation of V & RLC already given)



$V_1 = 10 + j20$
$\frac{V_2 - V_1}{10} + \frac{V_2}{-j20} + \frac{V_2 - V_3}{j30} = 0$
$\frac{V_3 - V_2}{j30} + \frac{V_3}{-j40} + \frac{V_3 - V_4}{50} = 0$
$\frac{V_4 - V_3}{50} + \frac{V_4}{60} - (-j2) = 0$

4) Push-Pull Amplifier (Voltage Output): Determine the voltages and currents for the following circuit when Vin = 2V DC.

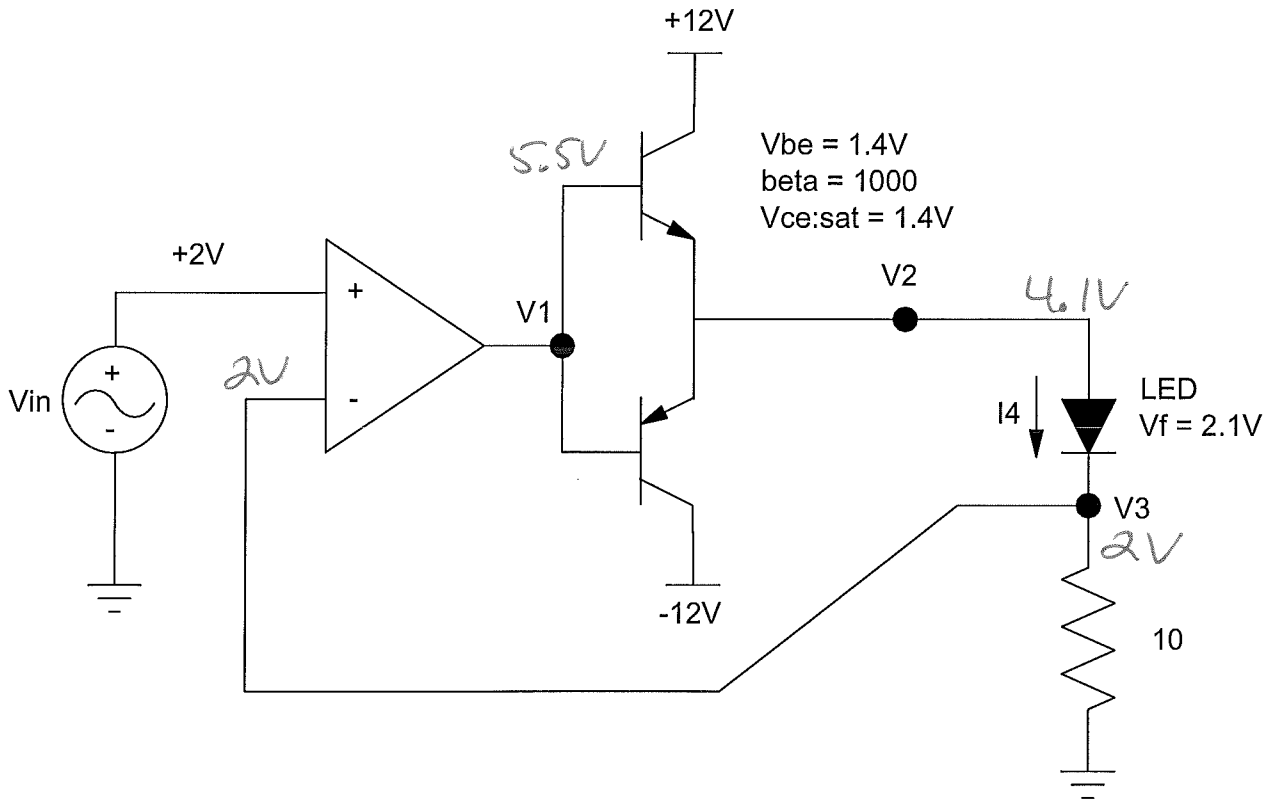
V1	V2	V3	I4
5.4V	4V	2V	190mA



$$I = \frac{4-2.1}{10} = 190mA$$

5) Push-Pull Amplifier (Current Output): Determine the voltages and currents for the following circuit when Vin = 2V DC.

V1	V2	V3	I4
5.5V	4.1V	2V	200mA



Bonus: Assuming nothing changes with our energy usage, how much will the Earth warm by the year 2100 as projected by the National Oceanic and Atmospheric Administration of the U.S. Government?

2°C to 6°C