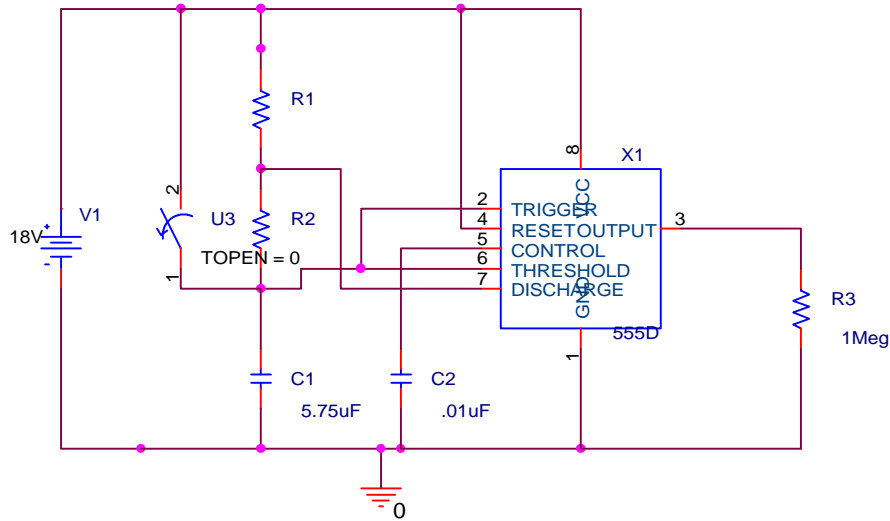
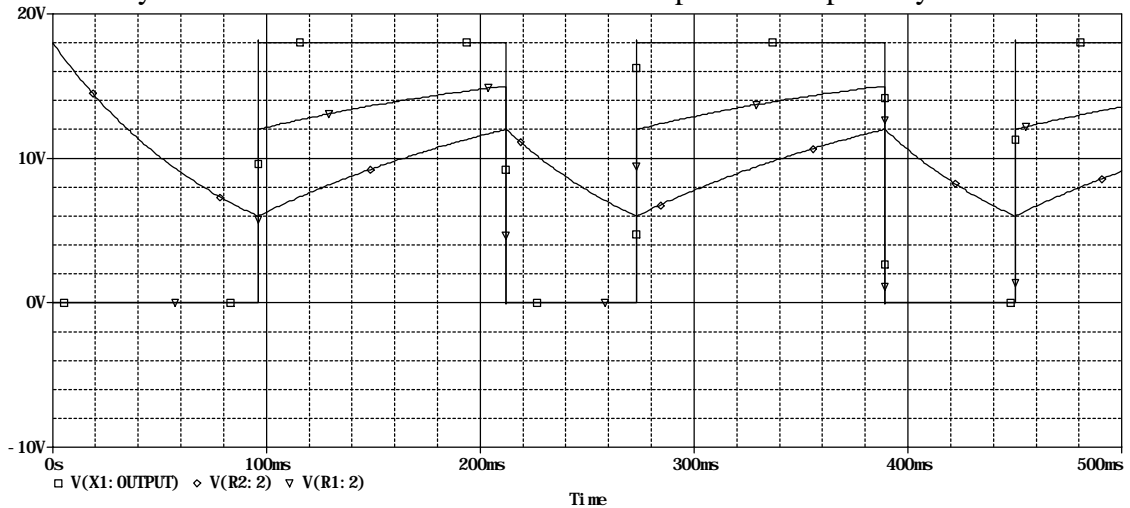


Be Sure to Explain All Answers
Quiz 3a

1. Astable Multivibrator



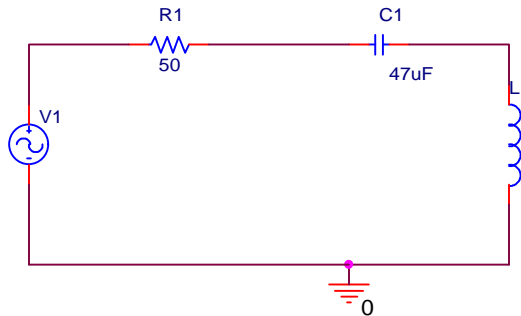
The circuit above has been simulated using PSpice. Using PROBE, the voltages at pins 2, 6, 7, and 3 have been displayed. Determine the values of resistors R1 and R2 from the information in this plot. Also, label which trace goes with which pin in each time period. Be sure that you label the traces in both the on and off parts of the pulse cycle.



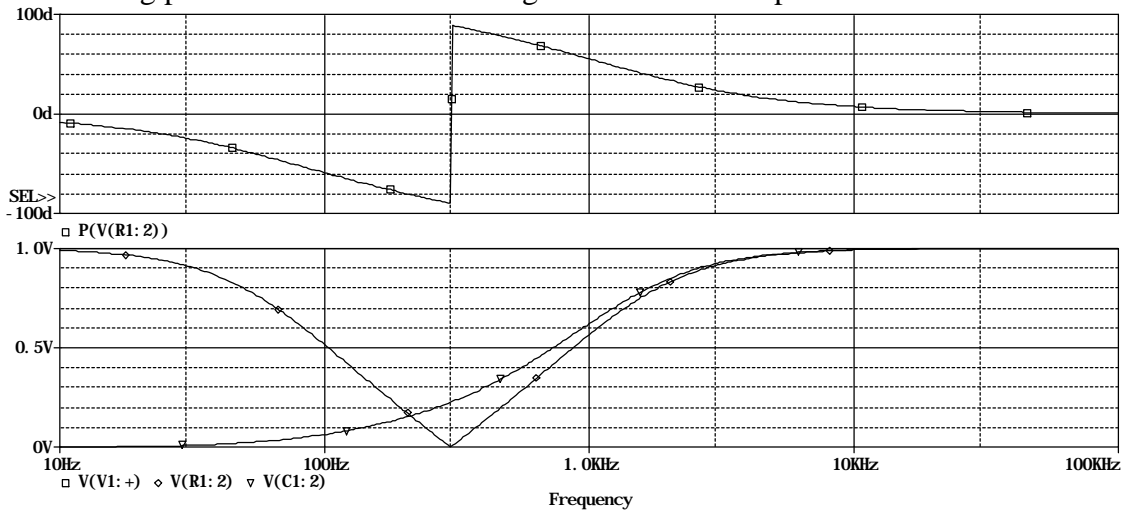
Be Sure to Explain All Answers

2. Inductance Measurement

The following circuit is constructed using an unknown inductor, a known capacitor, a known resistor and a function generator.



The following plot is obtained for the voltages at the indicated points in the circuit.



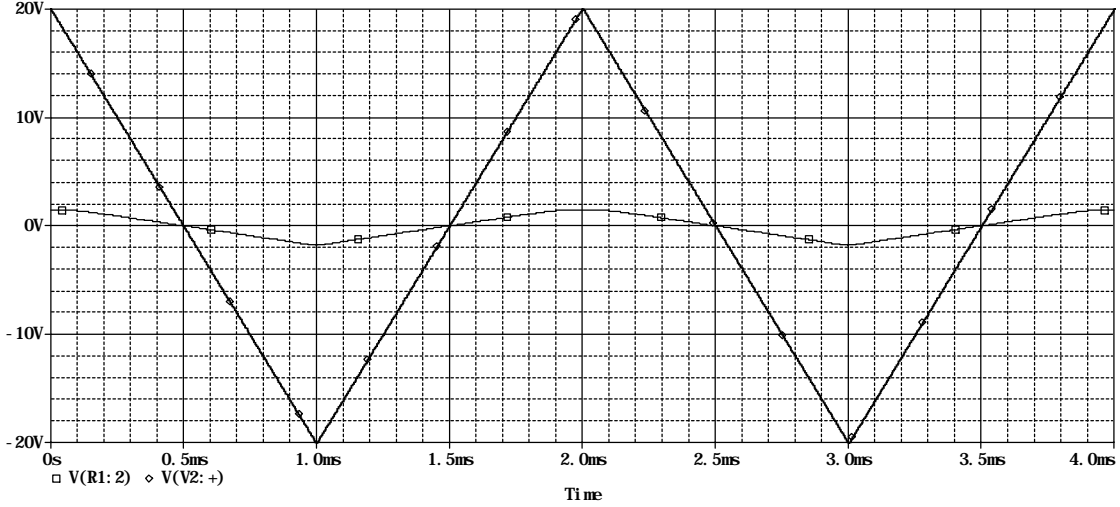
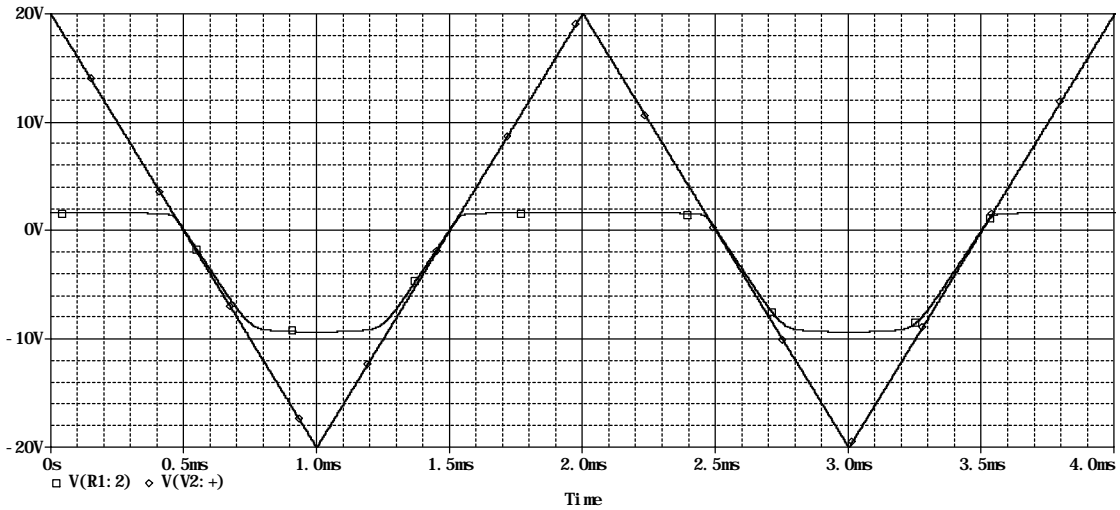
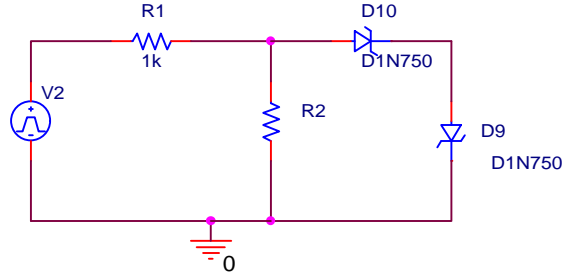
Determine the value of the unknown inductance.

The top trace shows a shift in phase at $f = 300\text{Hz}$ for the voltage between the resistor and the inductor. Why does this happen?

Be Sure to Explain All Answers

3. Zener Diode Voltage Regulation

Two zener diodes are used to regulate the voltage across the load resistor R2 in the circuit below. Two different values for R2 are tried (100 and 10kΩ), producing the two plots which follow. Identify which plot goes with which resistance value. Explain your answer.

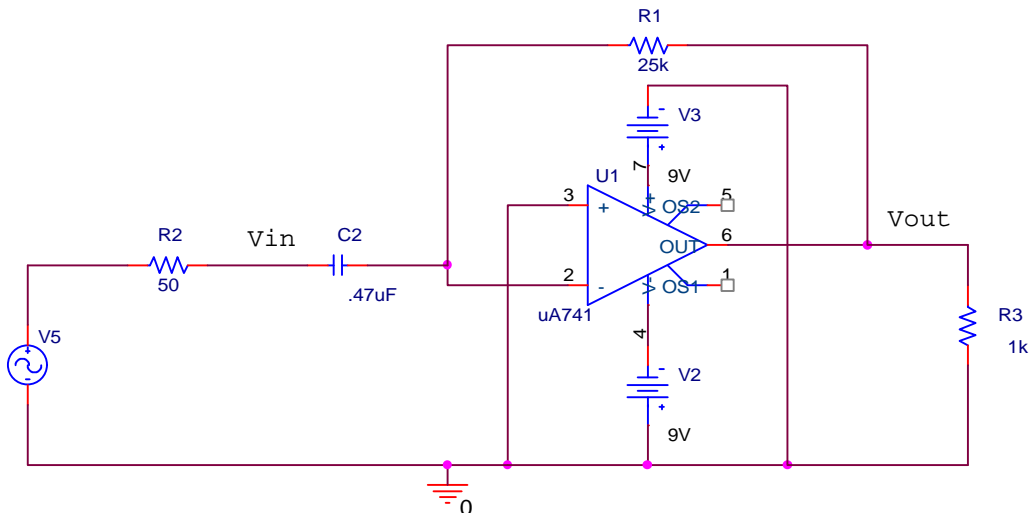


Be Sure to Explain All Answers

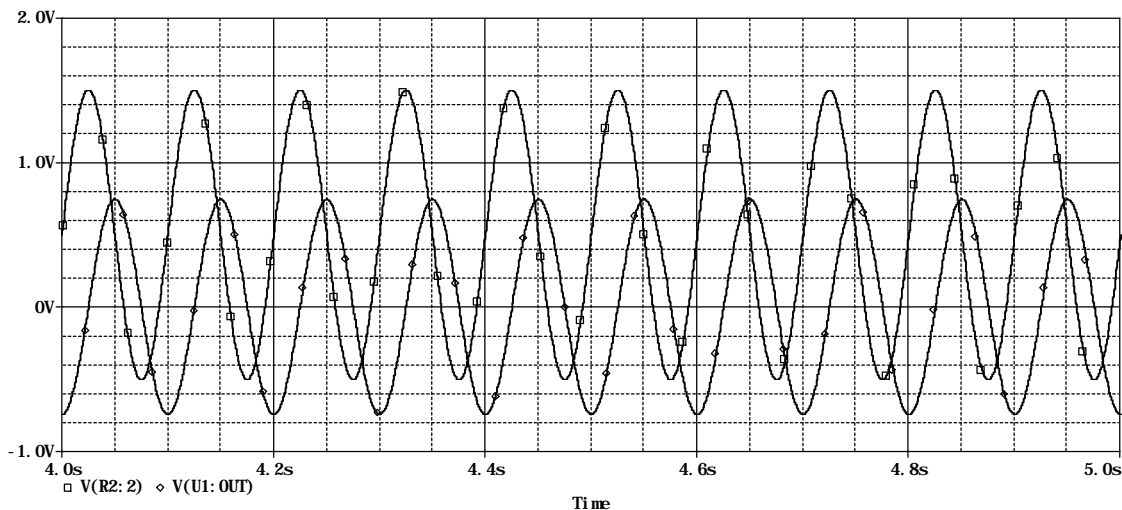
4. Op-Amp Configuration

The following circuit is simulated using PSpice. One of the two probe plots shown below shows the correct voltages at V_{in} and V_{out} in this circuit. Which one is the correct plot?

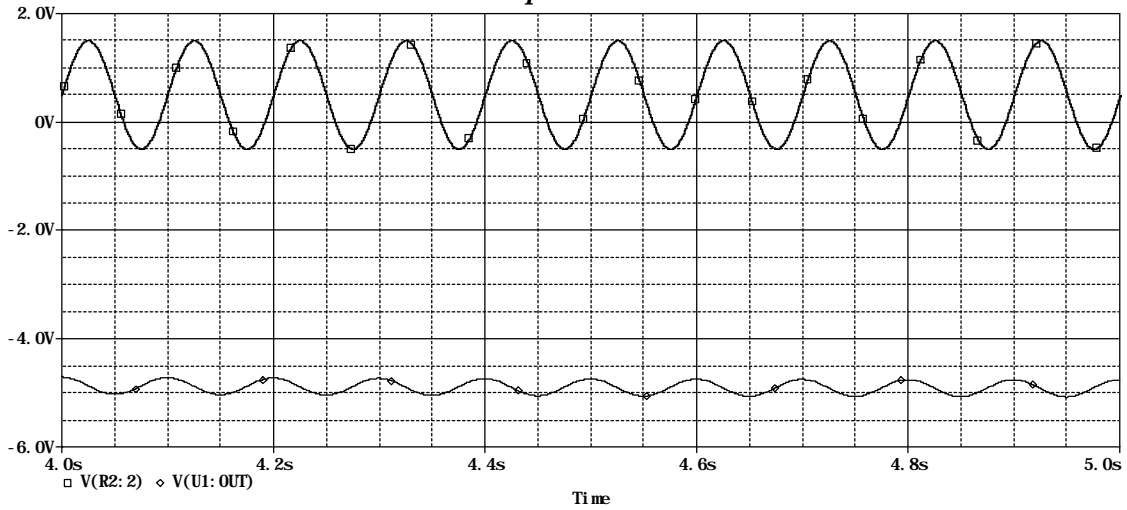
Both the input and output voltages are plotted in each case.



What kind of op-amp configuration is this circuit?



Be Sure to Explain All Answers



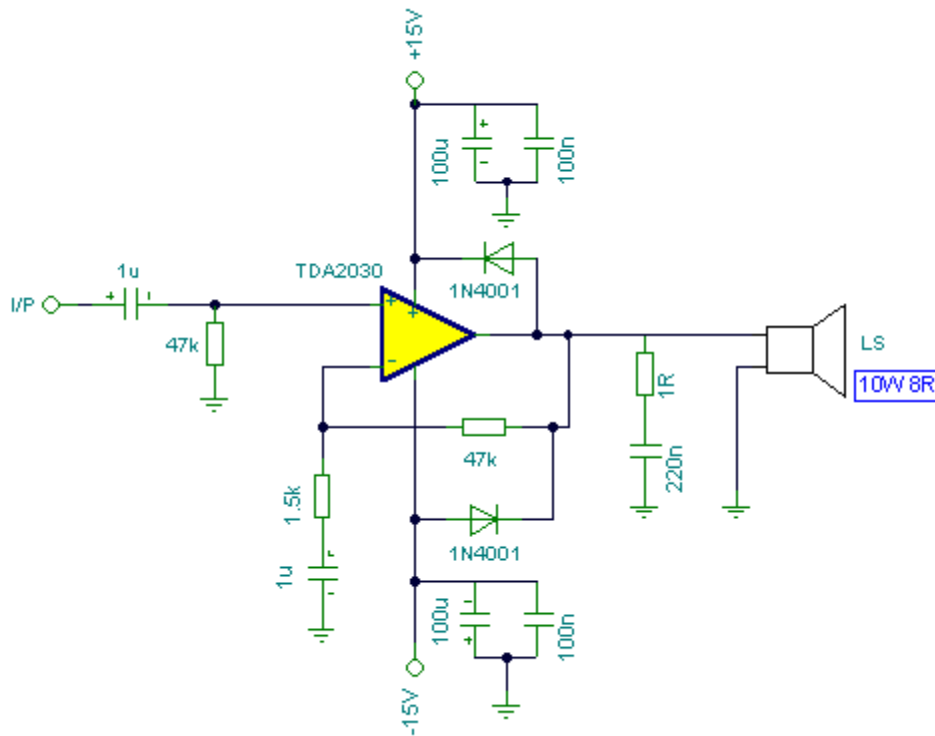
What relationship is supposed to exist between the two voltages that are plotted, if the circuit is working more-or-less in an ideal sense?

Show, using the information in the plot, that the circuit is working reasonably correctly.

Be Sure to Explain All Answers

5. Circuit Functionality

Shown below is an audio amplifier circuit.



Indicate on the circuit diagram where each of the following sub-circuits is found. Also, answer any questions asked.

Bypass Capacitors

Standard Amplifier (Is it an inverting or a non-inverting amplifier?)

Speaker

Protection Diodes

High Pass Filter (Give an example of a frequency that is blocked and a frequency that is passed)