

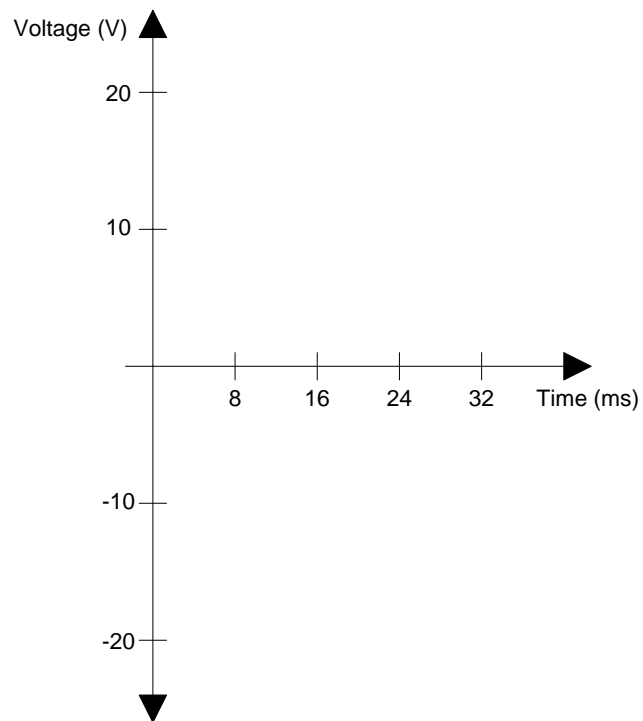
# EE 40 Final Lab: An Audio Amplifier

## Part 1: Power Supply

### Report

#### 1 Analyzing The Transformer

Sketch  $V_{out}$ :

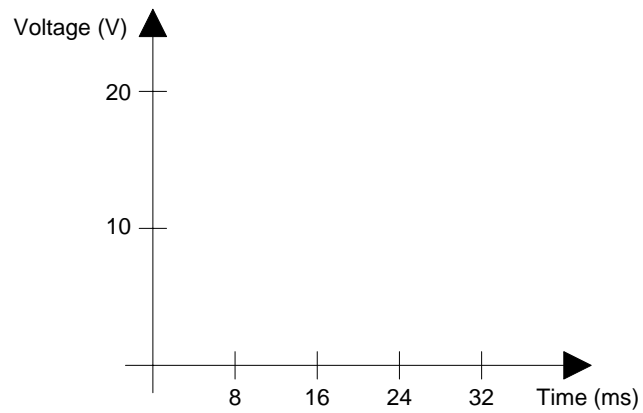


What is the maximum voltage you see at  $V_{out}$ ? What is the minimum?

How does the waveform differ from your expectations, and why is it this way?

## 2 Adding In The Bridge Rectifier

Sketch  $V_{out}$ :

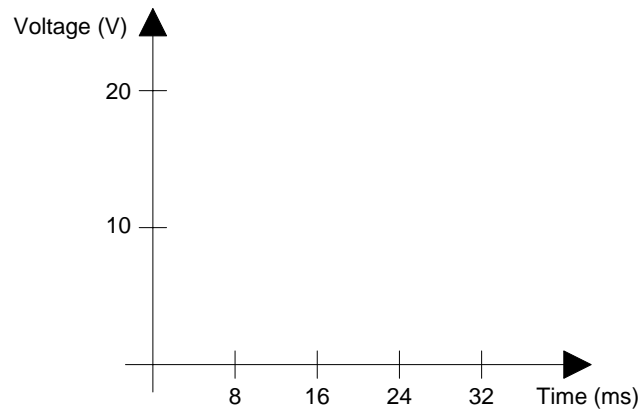


What is the maximum voltage you see at  $V_{out}$ ? What is the minimum?

What is the frequency of  $V_{out}$ ? Why?

### 3 Analyzing The Bridge Rectifier

Sketch  $V_{out}$ :



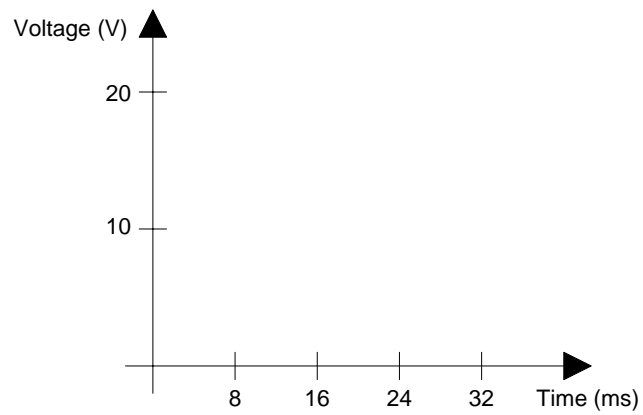
What is the average voltage seen at  $V_{out}$ ?

### 4 Bridge Rectifier Ripple

Use your oscilloscopes to measure  $V_{ripple}$  for this very simple AC to DC converter. What is the frequency of this ripple voltage?

### 5 Linear Voltage Regulator

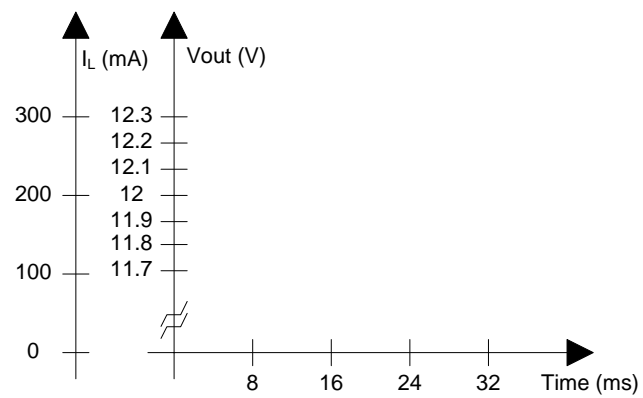
Sketch  $V_{out}$ :



What is the average value (DC component) of  $V_{out}$ ? What is  $V_{ripple}$ ?

## 6 Response To A Changing Load

Sketch  $V_{out}$  and  $I_L$  on the same axes:



Approximately how long does the v-reg take to stabilize the output voltage?

## **7 Efficiency**

Output power measurement:

Average input power measurement and calculation:

What is the total efficiency including the transformer?

Why is this efficiency so low? Where did all the excess power go? How can we build a better AC to DC

converter?