1. Problem 10.8 in the text.

2. For the circuit in problem 10.22, determine the maximum output voltage that would occur for this circuit without distortion caused by clipping. Test your answer using a transient Spice analysis with a sine wave of 2000 Hz. Use a blocking capacitor in series with the load resistance $R_L$. Use the default transistor model. To determine the amplitude of the signal source, recall that the emitter follower has a voltage gain of approximately 1.

3. Problem 10.38 in the text. To obtain the Fourier components and the total harmonic distortion from Spice, add the statement,

```plaintext
.FOUR <freq> <output variable>
```

This will give 9 harmonics by default.

4. The voltage regulator is shown in Fig. 10.32. In this circuit the Zener diode has a reference voltage of 5.5 V. Except for one other circuit modification, all circuit values are the same.

   a) What is the predicted ripple voltage across the capacitor?
   b) If $R_1 = 10 \, \text{k} \Omega$, what is $R_2$?
   c) Do the analysis of this circuit using Spice. Provide a net list of your circuit along with plots of input voltage at $C$ and the output voltage at $R_L$. Model the Zener diode as a 50 $\Omega$ resistor in series with a DC voltage source. Use the 1N4002 diode model, the 2N2222 BJT and the macro model for the $\mu$A741 operational amplifier all provided on the web site. If your version of Spice does not recognize the “nr” and the “isr” parameters in the diode, comment them out.