

Task 2.1.1 documentation

First, we should determine the peak voltage of our AC-source,

Our source $V_{rms}=220$ volt, then $V_{max}=220\sqrt{2} \approx 311.1269837$

So we put this as the amplitude of our source.

we should use a step down transformer to reach a voltage which is near to the 5V, so we have used center tapped transformer and apply the transformer's law:

$$\left(\frac{V_1}{V_2}\right)^2 = \frac{L_1}{L_2}$$

Where L_1 is the inductance of the primary coil, and L_2 is the inductance of the secondary coil.

Let $L_1=1H$, so $L_2=\frac{1}{\left(\frac{220}{5}\right)^2} \cong 0.006H$

So we guarantee that we would have a secondary voltage close to 5v, then we try to convert it from AC to DC by two phases:

The first phase: using a bridge to make a full wave rectification to the output wave.

the second phase: using a capacitor of about 100mF to ensure that the output wave is as steady as possible.

Additional:

I put a flywheel diode to avoid the back emf of the coil when we put off the circuit.