$$KVL:$$

$$-12 + V_{R_3} + 3V_F = 0$$

$$\Longrightarrow V_{R_3} = 12 - 3V_F$$

$$\Longrightarrow R_3 = \frac{V_{R_3}}{I_{sccR_3}} = \frac{V_{R_3}}{I_F} = \frac{12 - 3V_F}{I_F}$$

$$\bullet V_F = 3V \longrightarrow 3.4V$$

$$I_F = 25mA - 30mA$$

$$\Longrightarrow R_3 \in \left[\frac{12 - 3x3.4}{30x10^{-3}}; \frac{12 - 3x3}{25x10^{-3}}\right]$$

$$\Longleftrightarrow \ R_3 \in [60; 120](\Omega)$$

$$\bullet Choose R_1 = 40000\Omega$$

$$We have:$$

$$I_{R_2} = I_L = \frac{0.7}{40000} = 1.78x10^6$$

$$KVL:$$

$$-12 + V_{R_2} + V_{R_L} = 0$$

$$\Longrightarrow V_{R_2} = 12 - V_{R_L} = 12 - 0.7 = 11.3V$$

$$\Longrightarrow R_2 = \frac{V_{R_2}}{I_{R_2}} = 645414(\Omega)$$

$$Depend on R_L (Measured by VOM) Then:$$

$$R_2 = \frac{11.3}{\frac{0.7}{R_L}} = \frac{11.3XR_L}{0.7} = 12.14R_L(\Omega)$$

$$KCL:$$

$$I_{R_1} = I_{R_2} + I_{R_3}$$

$$\Longrightarrow I_{R_1} = I_{R_2} + I_F$$

$$\Longrightarrow I_{R_1} = \frac{0.7}{R_2} + I_F$$

$$\Longrightarrow I_{R_1} \in [0.025; 0.03](A)$$

$$Measurement on the laboratory; The voltage between two pins of the capacitor is around$$

$$V_{0C} = 12\sqrt{2}(V)$$

$$\bullet On the backup: V_{DC} = 18.8(V)$$

$$We design R_1 such that V_{DC} = 12(V)$$

$$\Longrightarrow R_1 = \frac{18.8 - 12}{I_{R_1}}$$

$$\Longrightarrow R_1 \in [227; 275]$$

$$Power: Power Index \geq 1.5$$