

Dik :

$$f = 15 \text{ kHz}$$

$$R = 100 \, \Omega$$

$$V_o = 15 \text{ V}$$

$$I_o = 2 \text{ A}$$

$$V_s = 27 \text{ V}$$

$$\Delta V_o = 0,5\%$$

-Mencari Duty Cycle

$$V_o = V_s D$$

$$D = \frac{V_o}{V_s}$$

$$D = \frac{15}{27}$$

$$D = 0,556$$

$$D = 55,6 \%$$

-Mencari nilai Induktansi

$$L_{\min} = \frac{(1-D)}{2f} R$$

$$L = 1,25 \text{ Lmin}$$

$$L_{\min} = \frac{(1-0,556)}{2(15000)} \times 100$$

$$L = 1,25 (1,48 \text{ mH})$$

-Mencari Nilai Kapasitor

$$C = \frac{1-D}{8L \left( \frac{\Delta V_o}{V_o} \right) f^2}$$

$$= \frac{1-0,556}{8(1,85 \text{ mH}) \left( \frac{0,005}{15} \right) (15000)^2}$$

$$= \frac{0,444}{1110}$$

$$= 400 \, \mu\text{F}$$

- Mencari  $\Delta I_L$

$$I_L = I_R = \frac{V_o}{R} = \frac{15}{100} = 0,15 \quad T = \frac{1}{f} = \frac{1}{15k} = 6,67 \times 10^{-5}$$

$$\Delta I_L = \frac{V_s - V_o}{L} DT$$

$$\Delta I_L = \frac{27-15}{1,85 \times 10^{-3}} \times (0,556)(6,67 \times 10^{-5})$$

$$\Delta I_L = 0,24 \text{ A}$$

$$V_L = V_o$$

$$L \frac{di_L}{dt} = V_o$$

$$\frac{di_L}{dt} = \frac{V_o}{L}$$

$$\Delta \frac{di_L}{dt} = \frac{\Delta i_L}{\Delta t} = \frac{\Delta i_L}{(1-D)T} = \frac{V_o}{L}$$

$$(\Delta i_L)_{\text{opened}} = \frac{V_o}{L} (1-D)T$$