POWER SUPPLY RIPPLE VOLTAGE CALCULATION

Load Current I_L = 100 mA; RL ~ 160 Ω;
C = 1000 μF; Vrms = 12 v

$$\tau = RC = 160 \times 1000 \times 10^{-6} = 160\,\text{ms} >> 8.3\text{ms}$$

60 Hz = 16.6 ms 120 Hz = 8.3 ms

$i_C = C\frac{dV}{dt}$ or, for this approximation: $i_C = C\frac{\Delta V}{\Delta t}$.

Solve for $\Delta V = \frac{i\Delta t}{C}$, where Δ V = ripple voltage, v_r.

$$v_r = \frac{0.1A \times 8.3ms}{1000\mu F} = \frac{0.1 \times 8.3 \times 10^{-3}}{10^{-3}}; v_r = 0.83volt$$

V_{DCMAX} = 1.4 x 12v = 16.8v

V_{DCMIN} = 16.8v - 0.83v = 16.0v

V_{DCAVE} = [16.8 - 16.0]/2 = 16.4v