

NAME: SOLUTIONS. 16

Sketch the output waveform and show what the DC and pp AC voltages are directly on the waveform.

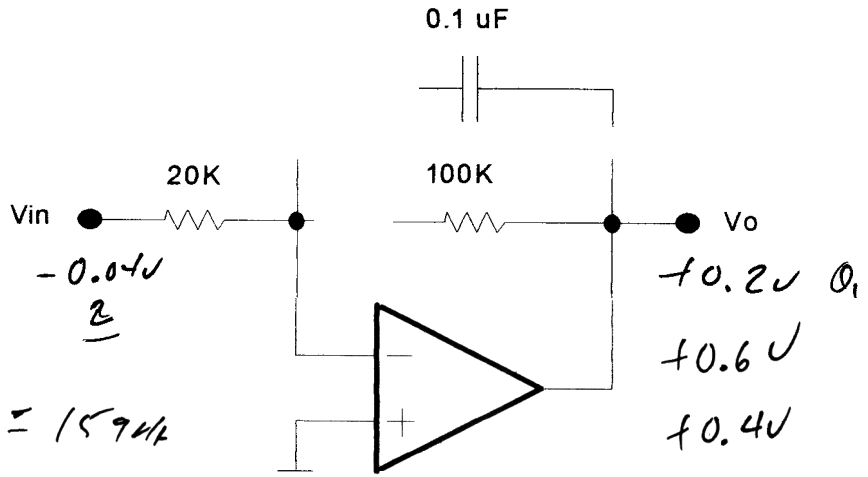
Average of squarewave is:

$$V_{in(ave)} = V_{in}^+ \left(\frac{PW}{T}\right) + V_{in}^- \left(\frac{SW}{T}\right) = 0.2 \times 0.2 - 0.1 \times 0.8 = -0.04V$$

$$\Delta V_{o(pp)} = V_{o(t_2)} - V_{o(t_1)} = -\left(\frac{1}{R_F C_F}\right) \int_{t_1}^{t_2} V_{in(AC)} dt$$

If $f = \frac{10}{2\pi R_F C_F} = \frac{10}{2\pi \times 100k \times 0.1\mu} = 159Hz$

- Q₁ 1kHz > 159Hz
- Q₂ 1kHz > 17.7Hz
- Q₃ 1kHz > 39.8Hz



$$\Delta V_o = -500 \times \int V_{in(AC)} dt$$

$$= -500 \times 48\mu = -24mV_{pp} \text{ Q}_1$$

$$= -250 \times 48\mu = -12mV_{pp} \text{ Q}_3$$

$$= -166.6 \times 48\mu = -8mV_{pp} \text{ Q}_2$$

