Figure 1 is the schematic for a Class B power amplifier. Assume the amplifier slew rate is sufficiently high that there is no slew rate distortion in the amplifier output and the base currents of the output transistors can be ignored.

The input to the amplifier is a sawtooth with an amplitude of $8V$ as shown in Fig.2. Determine:

The average power delivered to the 50 ohm load. Let $P/4 = p(t) = v^2(t)/R_0$

$$Po = \frac{1}{to} \int_{0}^{to} \frac{(8t/to)^2}{50} dt = \frac{64}{3*50} = 0.427\text{watts}$$

The peak collector current of $Q_1$

$$I_{C_{\text{max}}} = \frac{8}{50} = 0.16\text{amps}$$

The average collector power of $Q_1$

$$P_{Q1} = 0.5\left[ (1/to) \int_{0}^{P/4} 15*0.16(t/to) \ dt - 0.427 \right] = 0.5[15*0.16/2 - 0.427] = 0.387\text{watts}$$

The efficiency of the power amplifier

$$\eta = \frac{0.427/(15*0.16/2)}{0.355}$$

Establish the minimum betas of the output transistors if the op-amp output current is limited to ±10ma.

$$\beta_{\text{min}} = \frac{160\text{ma}}{10\text{ma}} = 16$$