2.1 From Eq.(2.5) and (2.6) we have: $\tau \approx \frac{4C_L}{\beta}\frac{V_{DD}}{(V_{DD}-|V_T|)^2}$

$$\frac{f_2}{f_1} = \frac{\tau_1}{2} = \frac{\frac{V_{DD1}}{(V_{DD1}-|V_T|)^2}}{\frac{V_{DD2}}{(V_{DD2}-|V_T|)^2}} \approx \frac{\frac{5}{(5-0.75)^2}}{\frac{3.3}{(3.3-0.75)^2}} \approx 0.545 \Rightarrow$$

$$\Rightarrow f_2 \approx 0.545 \cdot 100 = 54.5 \text{ MHz}$$

For the sake of simplicity, we assume that the capacitances involved do not change with the supply voltage. Note that, in practice, this assumption is not entirely true.

$$\frac{P_1}{P_2} = \frac{f_1 C_1 V_{DD1}^2}{f_2 C_2 V_{DD2}^2} \approx \frac{100 \cdot 10^6 \cdot 5^2}{54.5 \cdot 10^6 \cdot 3.3^2} \approx 4.21 \Rightarrow P_2 \approx \frac{1.3}{4.21} \approx 309 \text{ mW}$$