9.21 $f_T = \dfrac{g_m}{2\pi(C_\pi + C_\mu)}$

$g_m = \dfrac{1 \text{ mA}}{25 \text{ mV}} = 40 \text{ mA/V}$

$C_\pi = 10 \text{ pF}, C_\mu = 1 \text{ pF}$

$f_T = \dfrac{40 \times 10^{-3}}{2\pi(10 + 1) \times 10^{-12}} = 578.7 \text{ MHz}$

$f_\beta = f_T/\beta_O = (578.7/100) \times 10^6$

$= 5.78 \text{ MHz}$

9.25 $w_T = \dfrac{g_m}{C_\pi + C_\mu} \Rightarrow 2\pi \times 8 \times 10^9$

$$= \frac{40 \times 10^{-3}}{(C_\pi + 0.1) \times 10^{-12}}$$

$(C_\pi + 0.1) \times 10^{-12} = 0.79 \times 10^{-12}$

$C_\pi = 0.69$ pF

$g_m = 40$ mA/V

$$r_\pi = \frac{\beta}{g_m} = \frac{160}{40 \times 10^{-3}} = 4 \text{ k}\Omega$$

$$f_\beta = f_T / \beta = \frac{8 \times 10^9}{160} = 50 \text{ MHz}$$