7.24|

a) $t_r = \dfrac{2.4C}{K_p |V_{gs} - V_{TP}|} = \dfrac{2.4(.3pF)}{200 \times 10^{-6} |-2.5 + .6|}$

$= \dfrac{1.9nS}{2} \rightarrow T_{pLH} = 0.95nS$

$t_s = \dfrac{2.4C}{K_n(V_{gs} - V_{TN}|} = \dfrac{2.4(.3pF)}{200 \times 10^{-6}(2.5 - .6)} = \dfrac{1.9nS}{2}$

$\boxed{T_p = 0.95nS}$

$T_{PHL} \cdot 0.95nS$

b) $t_r = \dfrac{2.4(.3pF)}{2n| |-2 + .6|} = 2.57nS/2 = T_{pLH} = 1.29nS$

$t_f = \dfrac{2.4(3pF)}{2u |2 - .6|} = 2.57nS/2 = T_{pHL} = 1.29nS$

$\boxed{T_p = 1.29ns}$

c) $t_r = \dfrac{2.4(.3pF)}{2u| |-2.5 + .6|} = 3nS/2 = 1.5$

$t_f = \dfrac{2.4(3pF)}{2u |1.6 - .6|} = 3nS/2 = 1.5$

$\boxed{t_p = 1.5nS}$

7.27|

$t_r = \dfrac{2.4(.5pF)}{80u |-2.5 + .6|} = 7.9nS/2 = 3.95nS$

$t_f = \dfrac{2.4(.5pF)}{2u(2.5 - .6)} = 3.16/2 = 1.58nS$

$T_p = 1.59nS + 3.95/2 = \boxed{2.76SnS}$

7.31| $R = \dfrac{T_{pHL}}{1.2C} = \dfrac{3nS}{1.2(1 \times 10^{-12}F)} = 2.5k\Omega$

$(W/L)_N = 1/2.5k\Omega (100u)(2.5 - .6) = 2.105/1$

$= \boxed{2.11/1}$ $\rightarrow$

7.31

$$\left(\frac{W}{L}\right)_P = \frac{K_n'}{K_p'}\left(\frac{W}{L}\right)_N = \frac{100}{40}\left(\frac{2.105}{1}\right)$$

$$= 2.5\left(2.105/1\right) = \boxed{5.26/1}$$

7.35

$$\left[W/L\right]_N = 1\Big/\left[\frac{400ps}{1.2(200fF)(100u)(2.5-.6)}\right]$$

$$= \boxed{3.1579/1}$$

$$\left[W/L\right]_P = 2.5\left(3.1579/1\right) = \boxed{7.8947/1}$$

7.39

a) $$R = \frac{.3ns}{1.2(.5pF)} = 500\,\Omega$$

$$\left(W/L\right)_S = 1\Big/500(100u)(1.9) = \boxed{10.53/1}$$

$$\frac{W_P}{L_P} = 2.5\left(10.53/1\right) = \boxed{\frac{26.31}{1}}$$

b) $$T_p' = \left[\frac{1.5pF}{.5pF}\right] \cdot .3ns = \boxed{9ns.}$$