

Homework Assignment No. 13

You do not have to turn in this homework; everyone in class will receive full credit for it. In return, you are asked to fill out the course evaluation form online.

The material covered in this homework could appear in the final exam. Good luck.

Problem 1 – (10 points)

Problem 7.6-2 of Allen and Holberg 2nd edition

Problem 2 – (10 points)

Problem 8.4-1 of Allen and Holberg, 2nd edition

Problem 3 – (10 points)

Problem 8.6-3 of Allen and Holberg, 2nd edition

Problem 4 – (20 points)

A comparator consists of an amplifier cascaded with a latch as shown below. The amplifier has voltage gain of 10V/V and $f_{-3\text{dB}} = 100\text{MHz}$ and the latch has a time constant of 10ns . The maximum and minimum voltage swings of the amplifier and latch are V_{OH} and V_{OL} . When should the latch be enabled after the application of a step input to the amplifier of $0.05(V_{OH}-V_{OL})$ to get minimum overall propagation time delay? What is the value of the minimum propagation time delay? It may be useful to recall that the propagation time delay of the latch is given as $t_p = \tau_L \ln(V_{OH}-V_{OL}/2v_{il})$, where v_{il} is the latch input (ΔV_i of the text).

