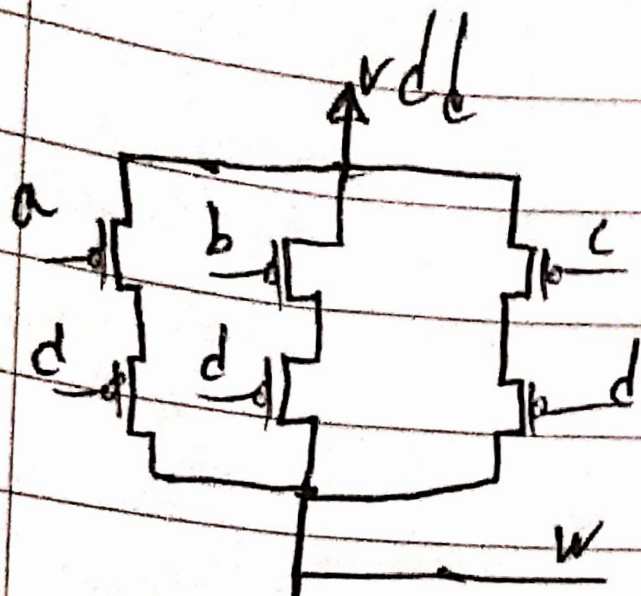


امیرمندی جوانی

سوال الف

$$f_s(a+b+c)d = ad + bd + cd$$

Pmos

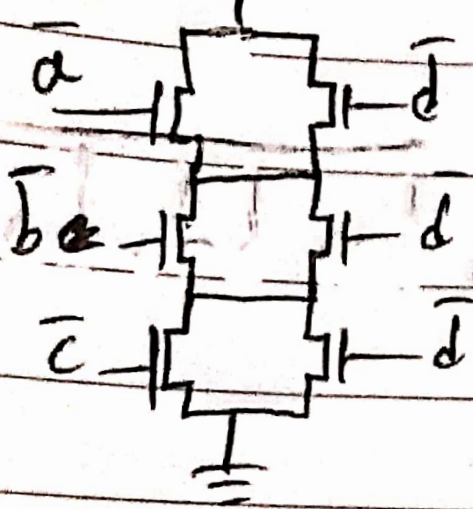


$\#(a, b, c, d)$   
 $t_{ol}$   $t_p$   $t_z$

+15

Nmos

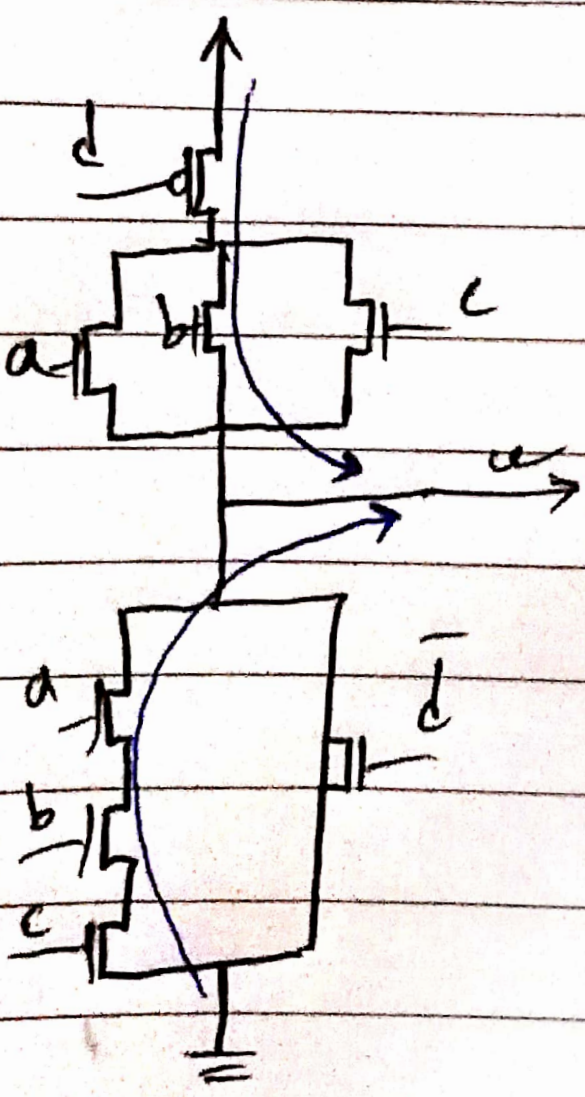
$$ad + bd + cd = (\bar{a} + \bar{b} + \bar{c})d$$



$\#(a, b, c, d)$

-5 for inverted inputs

↓  $t_{inv}$



$$t_{op}(12, 14) = 14$$

+10

$$t_{ol}(a+a, a+a+a) = 14$$

+10