Problem#1:

Implement the following function in static CMOS using minimum number of transistors:

$$F = A\,(\bar{B} + C) + \bar{D}\,E$$

Assume that the inputs are only available in true format.

Problem #2:

Show the CMOS implementation of a positive edge-triggered D-FF with asynchronous input R and S that affect the FF as shown in the table below:

Clk	R	S	Q^+
0	0	0	Q
⌐	0	0	D
X	0	1	1
X	1	0	0
X	1	1	$\tilde{Q}$

Problem #3:

Design the following circuit in static CMOS using minimum number of transistors. The maximum input frequency is 4 GHz, minimum channel length is 1 μm, t_{ox}=20 nm, Vtn=Vtp=0.8V, $I_{Dsat\ (nmos)}$ = 500 μA/μm