Question 1 (30 minutes – 3 points) 2016-17 Midterm exam (ICs)

a) Draw the transistor level CMOS circuit for the following logic function, using the lowest possible number of transistors: $S = (A + \overline{B})\overline{C}$
b) Draw a 2-input multiplexer using transmission gates at the transistor level. Use the multiplexer, as many times as necessary, to implement the logic function: $S = A\overline{B}$

Question 2 (20 minutes – 2 points) 2016-17 Midterm exam (ICs)

a) Explain briefly the thermal oxidation and photolithography processes in relation with integrated circuits manufacturing.
b) Explain the utility of design rules and give two examples.

Question 1 (40 minutes – 3 points) 2015-16 Midterm exam (ICs)

For the circuit of the figure:

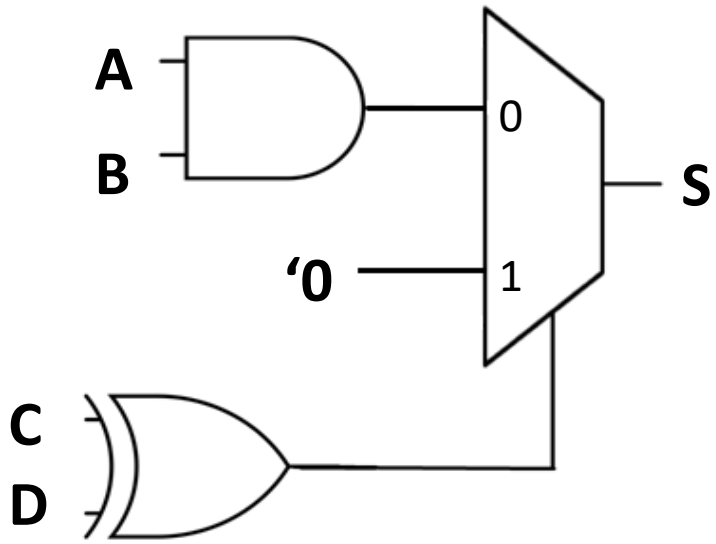

Figure Q1

a) Implement the corresponding schematic at transistor level with transmission gates and inverters.
b) Which is the main advantage of using transmission gates instead of pass transistors?

Question 2 (20 minutes – 2 points) 2015-16 Midterm exam (ICs)

a) Explain the main differences between CMOS and NMOS technology in terms of power consumption and delay.

b) Why are the design rules necessary? What is the meaning of the characteristic λ parameter?

Exercise 2 (30 min,3 points) 2018-19 Midterm exam (ICs)

a) Draw the transistor level CMOS circuit for the following logic function, using the lowest possible number of transistors: $S = (\overline{A} \cdot C) + \overline{B}$

b) Implement the previous function using transmission gates and inverter.

c) Which are the advantages of CMOS technology over NMOS technology?

Question

Given the following CMOS circuit:

a) Get your logical expression.

b) Create the truth table for the above circuit indicating for each combination the mode of operation of each transistor.