ELEX 2117 : Digital Techniques 2
2023 Winter Term

Quiz 3
1:30 – 2:20 PM
Friday, March 24, 2023
SW03-1710

This exam has three (3) questions on two (2) pages. The marks for each question are as indicated. There are a total of seven (7) marks. Answer all questions. Write your answers and all rough work in this paper and nowhere else. Show your work. Draw a box around your final answer. Numerical answers must include units. Books and notes are allowed. No electronic devices other than calculators are allowed. **Show your work.**

This exam paper is for:

Paper, Test 1 A00123456

Each exam is equally difficult.

Answer your own exam.

Do not start until you are told to do so.

Name: _____

BCIT ID: _____

Signature: _____

Question 1 — 3 marks

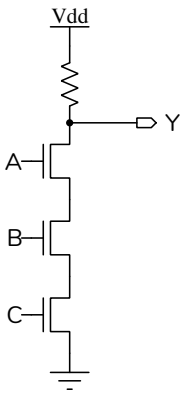
The table below shows part of the datasheet for a 74LS-series IC. What are the high- and low-level noise margins?

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

		Min	Max	
VIH	Input HIGH Voltage	2.2		V
VIL	Input LOW Voltage		0.8	V
VOH	Output HIGH Voltage	2.7		V
VOL	Output LOW Voltage		0.4	V

Question 2 — 2 marks

What logic function is implemented by the circuit on the right? Give your answer as a Boolean logic expression for `Y` involving `A`, `B` and `C`.



Question 3 — 2 marks

You are designing a circuit with an open-collector output. The rise-time time constant must be less than 100 µs. The total capacitance to ground on this output is 60 pF. What is the highest resistance that you can use for the pull-up resistor?

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Paper, Test 2 A00123456

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Question 1 — 3 marks

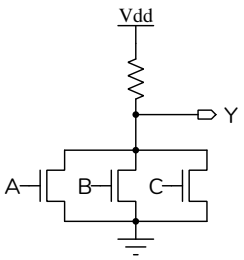
The table below shows part of the datasheet for a 74LS-series IC. What are the high- and low-level noise margins?

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

		Min	Max	
VIH	Input HIGH Voltage	2.0		V
VIL	Input LOW Voltage		0.8	V
VOH	Output HIGH Voltage	2.7		V
VOL	Output LOW Voltage		0.5	V

Question 2 — 2 marks

What logic function is implemented by the circuit on the right? Give your answer as a Boolean logic expression for `Y` involving `A`, `B` and `C`.



Question 3 — 2 marks

You are designing a circuit with an open-collector output. The rise-time time constant must be less than 100 µs. The total capacitance to ground on this output is 35 pF. What is the highest resistance that you can use for the pull-up resistor?