Midterm #2

General Information

- Date: Sunday, December 2nd, 2018
- Duration: 60 minutes
- Total marks: 20

Instructions and Guidelines

- No books or notes are permitted.
- Computer usage is prohibited.
- Cell phones must be turned off.
- Calculators are not allowed.
- Try to answer all questions.
- Write down your answers neatly in this booklet.
- To earn partial marks, justify your answers.
- If you need extra paper, request some from a proctor.

Grading

Question	Q1	Q2	Q3	Q4	Q5	**Total**
Points	4	3	5	3	5	**20**

Student Name: .....

ID Number: .....

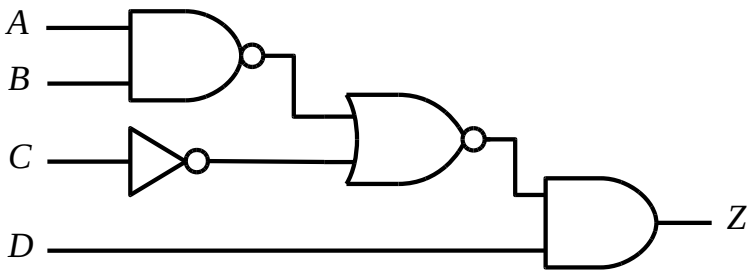
Q1 [4 Points]

Simplify the following expression using Boolean algebra. Justify each step in your solution by referring to the Boolean rule or law or theorem you use.

$$Z = (B + \bar{B}C)\left(\overline{A\bar{B}}\right) + AC + \bar{B}\bar{C}$$

Q2 [3 Points]

Write a Boolean expression for the output of the following circuit (Z) and then simplify that expression using Boolean algebra.



Q3 [5 Points]

Given below two copies of a Karnaugh map that describes a Boolean variable Z.

a. Construct a minimum SOP expression for Z.

AB \ CD	00	01	11	10
00	0	X	0	0
01	X	1	1	0
11	X	1	1	1
10	1	0	1	1

b. Construct a minimum POS expression for Z.

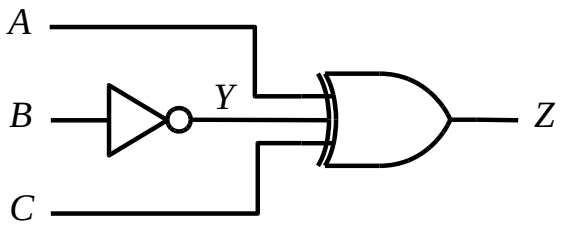
AB \ CD	00	01	11	10
00	0	X	0	0
01	X	1	1	0
11	X	1	1	1
10	1	0	1	1

Q4 [3 Points]

Implement the following Boolean expression using NOR gates: $Z = A(\bar{B} + C)$.

Q5 [5 Points]

Given the following logic circuit:



a. Fill up the truth table of Y and Z.

Inputs			Outputs	
A	B	C	Y	Z

b. Draw the waveforms of Y and Z.