



Department of Computer Science
Faculty of Computing
UNIVERSITI TEKNOLOGI MALAYSIA

SUBJECT : SCSR1013 DIGITAL LOGIC

SESSION/SEM : 2020/2021/1

LAB 1 : COMBINATIONAL LOGIC

NAME 1 : Yong Zhi Yan

NAME 2 :

DATE : 17.11.2020

REMARKS :

MARKS:

D. Preliminary Work

1. Draw a symbol, determine the IC number and produce a truth table for the following gate.

AND

Symbol:



IC Number: 7408

Truth Table 1

Input		Output
A	B	F
0	0	0
0	1	0
1	0	0
1	1	1

NAND

Symbol:

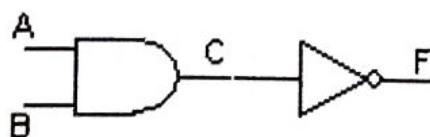


IC Number: 7400

Truth Table 2

Input		Output
A	B	F
0	0	1
0	1	1
1	0	1
1	1	0

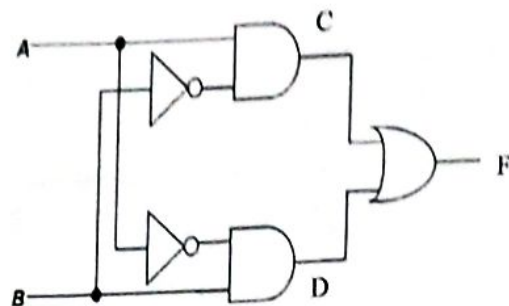
2. Complete the truth table for the following circuit.



Truth Table 3

A	B	C	F
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

3. Write the Boolean expression for output C, D and F the following circuit.



$$C = A\bar{B}$$

$$D = \bar{A}B$$

$$\begin{aligned} F &= C + D \\ &= A\bar{B} + \bar{A}B \end{aligned}$$

4. Complete the truth table for the circuit in (3) based on the Boolean expression produced for C, D and F.

Truth Table 4

A	B	C	D	F
0	0	0	0	0
0	1	0	1	1
1	0	1	0	1
1	1	0	0	0

E. Laboratory Work

- Part 1**
- Construct Circuit 1 on the breadboard. Connect all inputs (A, B) to a switches and output F to LEDs.



Circuit 1

Truth Table 5

Input		Output
A	B	F
0	0	0
0	1	0
1	0	0
1	1	1

- Test Circuit 1 and fill in Truth Table 5 for the circuit response to all possible input combinations. The Truth Table 5 should match the Truth Table 1 prepared in the Preliminary Work.



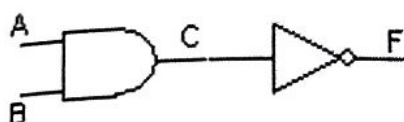
Fully Completed ☐

Partially Completed ☐

Checked by: _____

Part 2

- Construct Circuit 2 on the breadboard. Connect all inputs (A, B) to a switches and output C and F to LEDs.



Circuit 2

Truth Table 6

A	B	C	F
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

- Test Circuit 2; fill in Truth Table 6, for the circuit response to all possible input combinations.

- Compare Truth Table 6 to Truth Table 2. What conclusion can you make?

The final output of Circuit 2 (output F) is same with the output of Truth Table 2. Hence, Circuit 2 is a NAND gate.



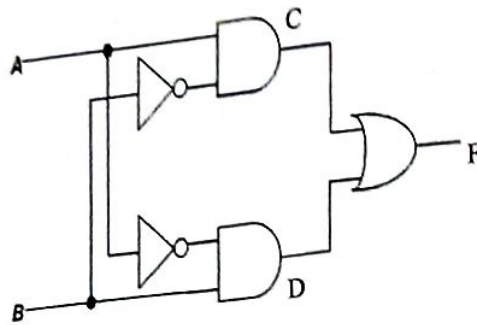
Fully Completed ☐

Partially Completed ☐

Checked by: _____

Part 3

6. Construct circuit 3 on the breadboard. Connect all inputs (A, B) to a switches and output C, D and F to LEDs.



Truth Table 7

A	B	C	D	F
0	0	0	0	0
0	1	0	1	1
1	0	1	0	1
1	1	0	0	0

Circuit 3

7. Test Circuit 3; fill in Truth Table 7 for the circuit outputs (C, D, and F) for all possible input combinations.
8. What single gate does Circuit 3 represent?
Exclusive - OR gate (XOR gate).



Fully Completed ☐

Partially Completed ☐

Checked by: _____