

BRAC UNIVERSITY
Department of Electrical and Electronic Engineering
CSE350: Digital Electronics and Pulse Techniques

Experiment No: 1

Implementing Diode Logic (DL) gates

Objective:

1. Construct a DL gate
2. Understanding the circuit operation

Equipments:

1. Oscilloscope
2. Digital Trainer Board
3. Digital Multimeter
4. DC power supply

Components:

- | | |
|------------------------|----------|
| • NPN Transistor: C828 | 1pieces |
| • Diode 1N4003 | 2pieces |
| • Resistors | |
| 450 | 2 pieces |
| 100K | 1 piece |
| 15K | 1 piece |
| 2.2K | 1 piece |

Circuit Diagram:

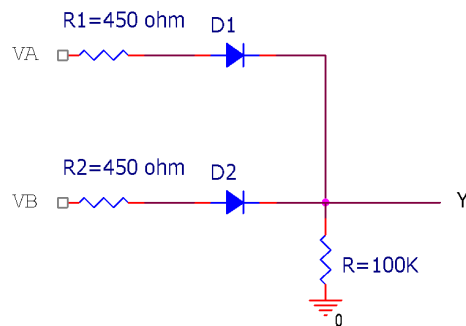


Fig 1: OR gate

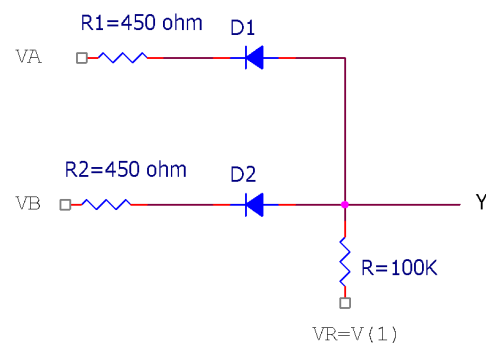


Fig 2: AND gate

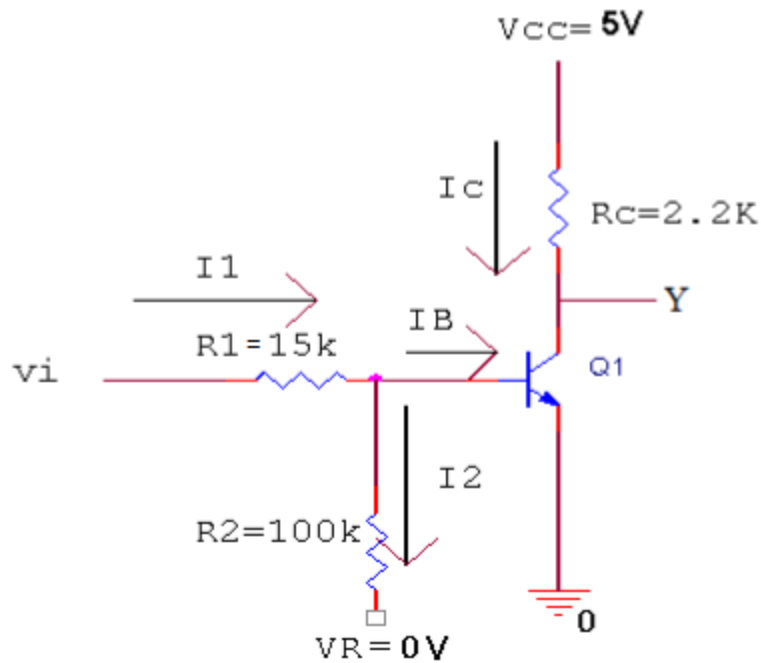


Fig 3: INVERTER for positive logic

Laboratory tasks:

1. Connect the circuit as shown in Fig: 1,2 & 3
2. Observe the output for all possible input combinations thus verify the type of gate.
3. Fill up the following table for OR gate, AND gate and inverter.

V_A	V_B	V_{R1}	V_{R2}	I_{R1}	I_{R2}	$V_R=Y$

V_A	V_B	V_{R1}	V_{R2}	I_{R1}	I_{R2}	$V_R=Y$

OR Gate

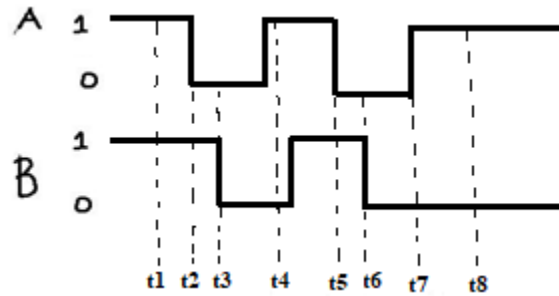
AND Gate

V_i	V_{R1}	V_{R2}	V_{RC}	I_1	I_2	I_B	I_C	Y

Inverter

Report:

1. Verify that the transistor will be operating in the saturation and cutoff region in two cases for the inverter circuit (Use experimental data for verification).
2. Explain the operation of diode OR circuit.
3. (For both OR & AND gate circuits) Will the diodes D_1 and D_2 work, if $V_A = V_B = 6V$ and $V_R = 5V$?
4. What is the function of $V_R = 0V$ at the base of an inverter in figure 3?
5. Assuming AND gate, Draw the output



Reference: Microelectronics: Digital and Analog Circuits and Systems by Jacob Millman.
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