EXPERIMENT 3. AND and OR Gates

Equipment and parts required:

1 TTL Quad 2-input OR Gate (7432)
1 TTL Triple 3-input AND Gate (7411)
1 Power Supply
1 Digital Voltmeter
1 Function Generator
1 Digital Oscilloscope

1. Find data sheet and specifications

Find I/O pin numbers and specifications of 7411 and 7432 from data sheet downloaded from the web (ECE labs)

Pin numbers: Vcc, ground, input and outputs of all NAND gates.
Absolute maximum voltages: Vcc and voltages at input pins.
Normal operating voltages: V_{IL}, V_{IH}, V_{OL}, V_{OH}

2. Connect power supply

Adjust power supply at 5 Volts and set the current limit to maximum. Then connect the power supply to Vcc and Gnd bus. Do not connect the power to the integrated circuit at this time.

3. Measure input and output characteristics of OR

Connect the output pin of a OR gate to a digital voltmeter, and measure the output voltage for the two levels of input voltages. Before the measurement, connect Gnd and Vcc pins to the power buses of the breadboard.

Input 1	Input 2	Output (V)
0 Volts	0 Volts	
0 Volts	5 Volts	
5 Volts	0 Volts	
5 Volts	5 Volts	

4. Construct a 3-input OR

Construct a 3-input OR using two 2-input OR by connecting the output of the first OR gate to an input of the second OR gate. Verify the operation by observing output signal for different combinations of input signals.

Input 1	Input 2	Input 3	Output
0	0	0	
0	0	5	
0	5	0	
0	5	5	
5	0	0	
5	0	5	
5	5	0	
5	5	5	

5. Observe the operation of a 3-input AND

Verify the AND operation by observing output signal for different combinations of input signals.

Input 1	Input 2	Input 3	Output
0	0	0	
0	0	5	
0	5	0	
0	5	5	
5	0	0	
5	0	5	
5	5	0	
5	5	5	