Lab #3

Name: _____ Per: _____

Title: OR GATES

Materials:

[1] 7432 2-input OR gate IC
[1] led with 150-Ω resistor
[5] logic switches

Procedure:

1. Insert the 7432 IC into the breadboard.
2. Connect power to the 7432: red wire for +5V(V_{cc}) and the black wire for GND.
3. Refer to Fig. 3-5. Wire the 2-input OR gate (see pinout diagram).
4. Move input switches A and B to each combination shown in the left side of the truth table in Table 3-4. Observe and record the results in the OR gate 1 column. Record a logical 0 if the light is OFF; record a logical 1 if the light is ON.
5. Now wire and test each of the other three OR gates packaged inside the 7432 IC. Record their outputs in the right-hand columns of Table 3-4. Record 0's and 1's. **Get Instructor's Signature. (all 4 gates should be wired with a separate pair of switches and an led for each)**
6. Wire the 5-input OR gate using all four 2-input OR gates in the 7432. Pin numbers are shown in Fig. 3-6.
7. Operate and observe the output of the 5-input OR gate as you place the input switches (A-E) in the 32 different combinations in the Input column of Table 3-5. Record the outputs in the Output column of Table 3-5. **Get Instructor's Signature.**

Questions (answer on a separate piece of paper – **"Draw" means you must use a template**):

1. **Draw** a single logic symbol for the 5-input OR gate you wired in this experiment. Label the inputs A, B, C, D, and E; label the output Y.
2. **Draw** a logic diagram of a 3-input OR gate using two 2-input OR gates. Label the inputs A, B, and C; label the output Y.
3. **Draw** the truth table for a 3-input OR gate. Fill in the truth table completely.
4. When powering the IC in this experiment, the GND is connected to the _____ of the power supply.
5. A logical 0 on the truth table in this experiment means that input or output is _____ (near GND, near +5V).
6. A logical 1 on the truth table in this experiment means that input or output is _____ (near GND, near +5V).
7. A truth table with two inputs has how many switch combinations?
8. A truth table with three inputs has how many switch combinations?
9. A truth table with five inputs has how many switch combinations?
10. The OR gates unique output is a _____(0,1), which only occurs when all inputs are _____ (high, low).

Inputs		**Outputs**			
A	B	OR gate 1	OR gate 2	OR gate 3	OR gate 4
0	0				
0	1				
1	0				
1	1				

Table 3-4 Truth Table for 7432

Table 3-5 5-input OR gate

INPUTS					OUTPUTS
A	B	C	D	E	
0	0	0	0	0	
0	0	0	0	1	
0	0	0	1	0	
0	0	0	1	1	
0	0	1	0	0	
0	0	1	0	1	
0	0	1	1	0	
0	0	1	1	1	
0	1	0	0	0	
0	1	0	0	1	
0	1	0	1	0	
0	1	0	1	1	
0	1	1	0	0	
0	1	1	0	1	
0	1	1	1	0	
0	1	1	1	1	
1	0	0	0	0	
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1	0	0	1	1	
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1	0	1	1	0	
1	0	1	1	1	
1	1	0	0	0	
1	1	0	0	1	
1	1	0	1	0	
1	1	0	1	1	
1	1	1	0	0	
1	1	1	0	1	
1	1	1	1	0	
1	1	1	1	1	

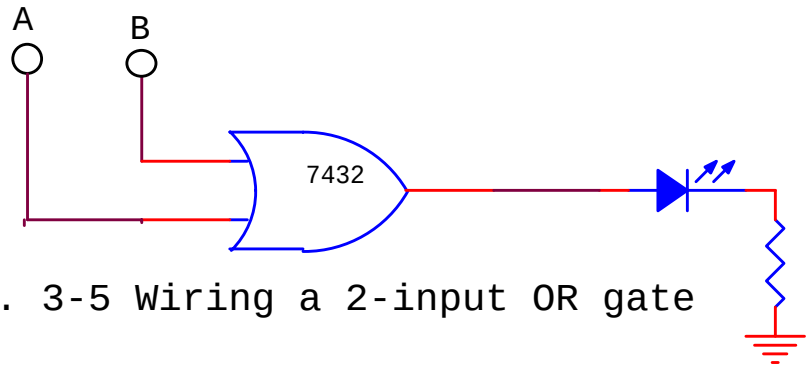

Fig. 3-5 Wiring a 2-input OR gate

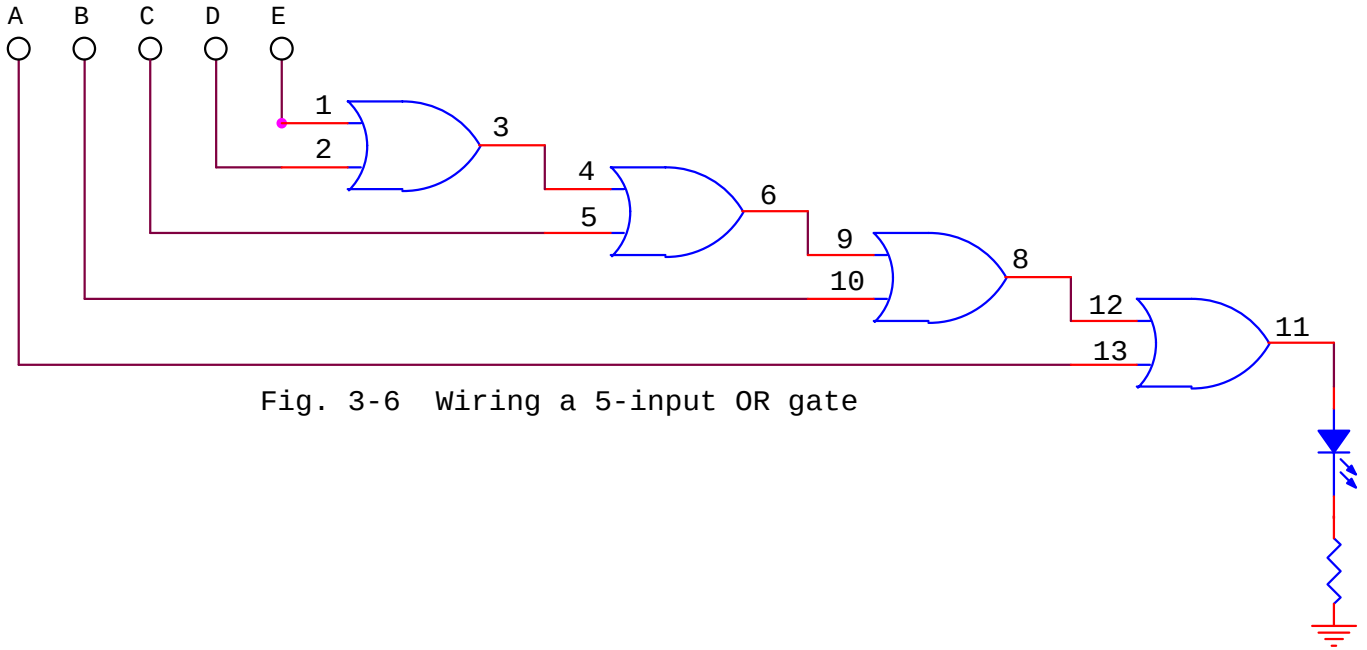

Fig. 3-6 Wiring a 5-input OR gate