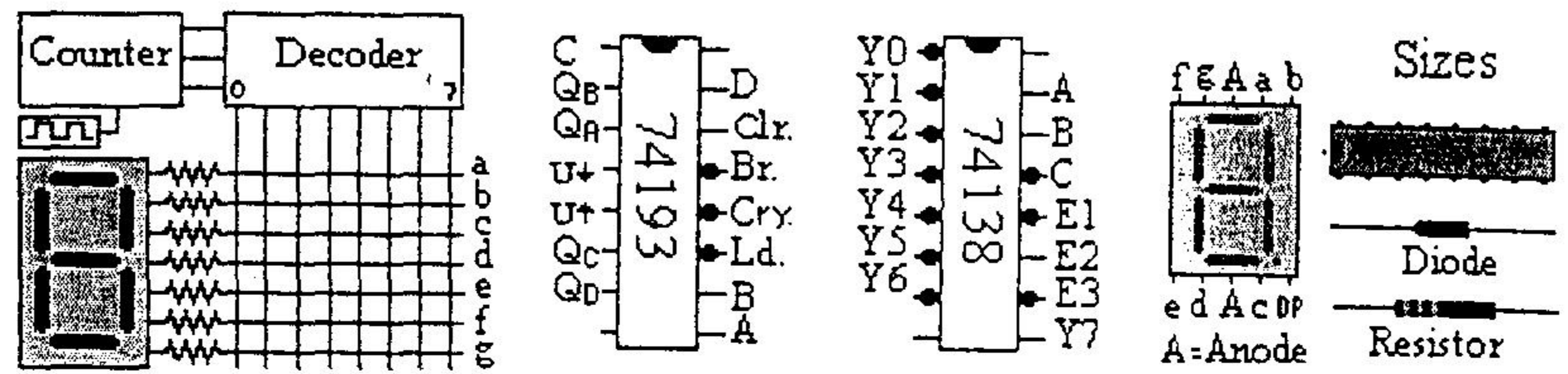


PHY 233 Lab Final

1

Connect the circuit given on the trainer board shown. Assume that you have a sufficient number of diodes, and store the letter L and in memory location 2. Other locations remain blank.

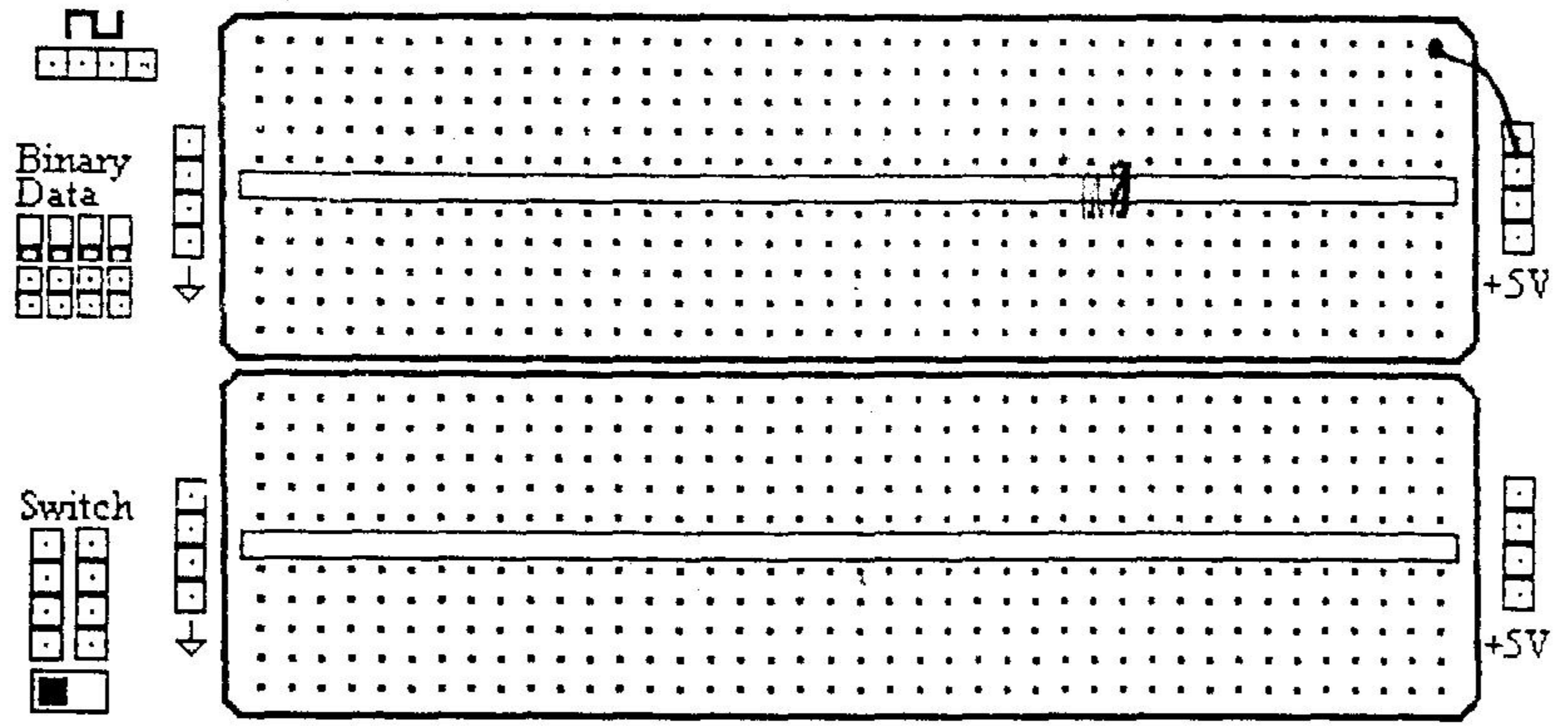


You must make all of the necessary connections so that the chips function correctly.

Note 1: The cathode of the diodes is indicated by the light coloured and tapered left tip.

Note 2: The trainer board and some of the pins on the chips have been simplified for ease.

- Correctness: 22 points
- Neatness: 4 points.
- Correct sizes: 4 points.



2

List the components used for 3 of the 4 experiments mentioned below. (3x5 = 15 pts.)
 It is sufficient to give the function of a chip (e.g. Counter). No points for saying "board" or "wires".
 Note: Double penalty for wrong items

- a. 10x10 counter
- b. Data transmission in series
- c. Logic Probe for the Blind

3

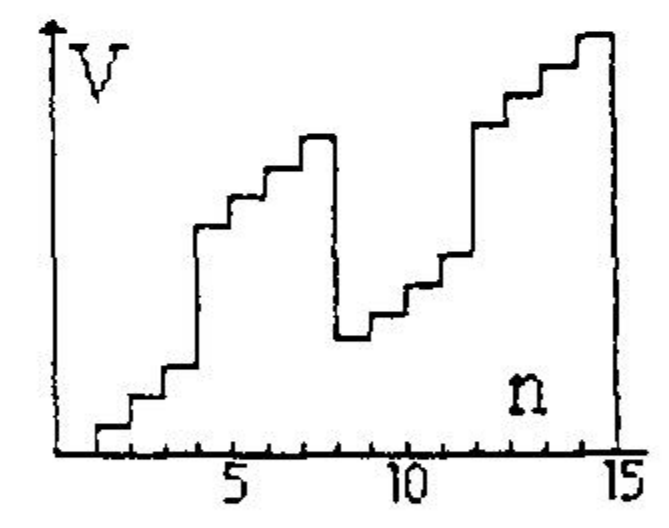
Describe the procedure of the following experiments briefly: (3x5 = 15 pts.)

- a. Parity of Transmitted Data
- b. ROM
- c. Spelling

4

Answer 6 of the following 9 questions. (6x5 = 30 points)
 Note: The 7th answer will be graded on the basis of double penalty.

- a. The Syllabus lists 19 experiments. Name two that were NOT performed.
- b. In which experiment was the Enable pin used as an input pin?
- c. Why was the catalogue diagram misleading in the Decade Counter experiment?
- d. How did we decide the value of the RC in the "Logic Probe for the Blind"?
- e. What will the IC tester display if you plug a chip upside down and press "Search"?
- f. When will the Logic probe light Red AND Green at the same time?
- g. In which experiment did we use Inverters in parallel? What for?
- h. Why does the clock on the Trainer have THREE outputs?
- i. Figure shows the output of a binary ladder you connected to a counter. What do you think is the obvious mistake? Justify.



5

You are given a list of 8 malfunctions and a list of 14 possible causes. For 5 of the malfunctions Indicate next to each "trouble" the likely cause or causes. Explain your answer briefly. No explanation, no points.

Note: Answers beyond 6 will be corrected on the basis of double penalty.

(3x5 = 15 pts.)

- Causes:
- C1. Power Supply on Trainer board does not give exactly 5v
 - C2. Chip plugged backwards
 - C3. Wrong chip plugged in
 - C4. V_{cc} pin shorted to ground
 - C5. Chip plugged between two breadboards
 - C6. V_{cc} pin not connected
 - C7. Two output or input pins are interchanged
 - C8. Clock at wrong speed (specify whether too fast or too slow)
 - C9. A wire is loose or internally broken
 - C10. A pin on the chip folded while plugging
 - C11. Chip burnt
 - C12. Ground pin not connected
 - C13. Chip has a broken pin
 - C14. Clock has a weak or bad signal

Malfunctions:

- a. Seven segment LED shows "Karshoni" characters.
- b. Pilot light on Trainer Board turns off when you connect the circuit
- c. Chip too hot
- d. One of the pins on a chip is neither high nor low
- e. All the pins of a chip are high.
- f. Chip works only when you press it down by a finger
- g. An LED output is lights dimly (not clearly on or off)
- h. All the LED outputs of a counter are on and seem to "flicker"

Good Luck!

$2 \times 30 + 3 \times 15 = 105$