CPE201 HW 3 (100 points)

Answer all questions completely. Put a box around the final solution. Put your name on it. Show your work.

By hand:

1. A waveform is measured on an oscilloscope with an amplitude that has 4 divisions. If the vertical resolution is set to 5V/div, what is the amplitude of the waveform?

4 divisions times 5V/division equals 20V.

2. Indentify the Boolean algebra law or rule that is used in the following statements

    a. AB'CD + ABD = DAB'C + DAB

This is the commutative law

    b. AB' + AB'D = AB'

This is Rule 10, A + AB = A

3. Describe the tradeoffs between using breadboards and PCBs

Breadboards are for prototyping. They are more expensive, must use through hole parts, are bigger, and not as durable as PCBs. They are however modifiable.

PCBs are for production/finished designs. They are more compact, can use through hole or surface mount parts, are less expensive and can be much more complex (for the same size) than breadboards circuits. They are not changeable.

4. What type of test equipment (and why) would you use to diagnose a problem with a set of logic gates?

You could start with an oscilloscope or multimeter to probe what the logic levels are and where the problem is occurring.

5. What type of test equipment (and why) would you use to diagnose a problem with garbled communication on a SPI bus?

You could use an oscilloscope or a logic analyzer to see the data that is on the bus and diagnose how the messages are being garbled.