# 數位邏輯設計 Ch2 HW

注意事項：請寫出詳細計算與分析過程，不可以只寫答案!

Problems:

**2.1** Draw the symbol for the NOT gate (inverter) in both rectangular-outline and distinctive-shape forms.

**2.5** Write a sentence that describes the operation of a 4-input OR gate with inputs *J*, *K*, *L*, and *M* and output *N*. Make the truth table of this gate and draw an asterisk beside the line(s) of the truth table indicating when the gate output is in its active state.

**2.7** State how four switches must be connected to represent a 4-input OR function. Draw a circuit diagram showing how this function can control a lamp.

**2.15** A pump motor in an industrial plant will start only if the temperature and pressure of liquid in a tank exceed a certain level. The temperature sensor and pressure sensor, shown in Figure 2.47 each produce a logic HIGH if the measured quantities exceed this value. The logic circuit interface produces a HIGH output to turn on the motor. Draw the symbol and truth table of the gate that corresponds to the action of the logic circuit.

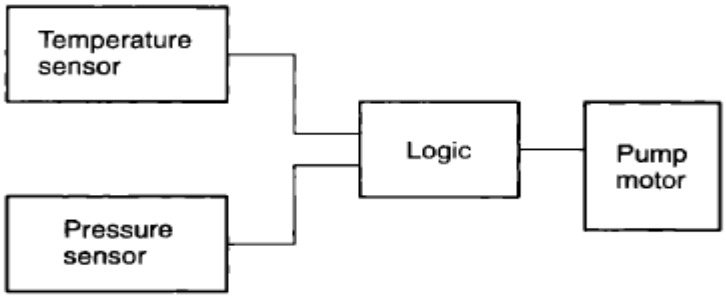


**FIGURE 2.47** Problem 2.15: Temperature and Pressure Sensors

**2.25** Refer to Figure 2.51. State which two gates of the three shown are DeMorgan equivalents of each other. Explain your choice.

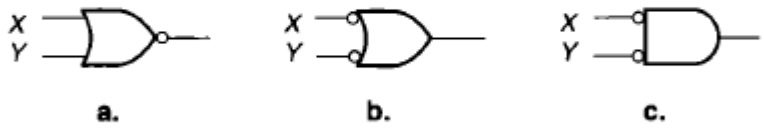


**FIGURE 2.51** Problem 2.25: Logic Gates

**2.35** The *A* and *B* waveforms shown in Figure 2.53 are inputs to an OR gate. Complete the sketch by drawing the waveform for output *Y*.

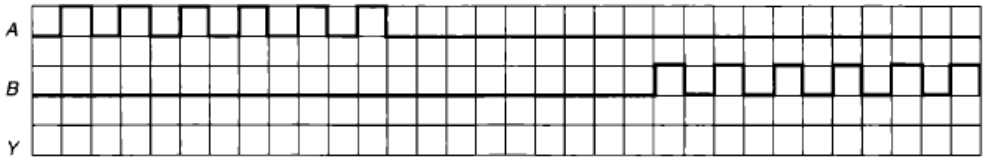


**FIGURE 2.53** Problem 2.35: Waveforms