Physics 623: HW 8

Do the following Exercises from Horowitz & Hill (Third Edition). Reading the Exercises in the context of the chapter may provide hints on how to solve some of the problem.

10.2) Multiply +2 by -3 in 3-bit 2's complement binary arithmetic. *Hint*: the answer is -6.

10.3) Show that the 2's complement of -5 is +5.

10.5) Show how to use the exclusive-OR gate as an "optional inverter," i.e., it inverts an input signal or buffers it without inversion, depending on the level at a control input.

10.8) Using 2-input gates, show how to make (a) INVERT from NOR, (b) OR from NORs, and (c) OR from NANDs.

10.9) Show how to make (a) a 3=input AND from 2-input ANDs, (b) a 3-input OR from 2-input ORs, (c) a 3-input NOR from 2-input NORs, and (d) a 3-input AND from 2-input NANDs.

10.11) Draw the circuit of a 3-input CMOS OR gate.

10.16) Show how to make a 2-input select, using a pair of 3-state buffers and whatever other logic you need. (Rewritten by Mitch: Show how to make a 2-input select, which takes 3 inputs (A, B, and SELECT) and outputs either A or B depending on the value of SELECT)

10.21) Design a "simple" encoder: a circuit that outputs the (2-bit) address telling which of 4 inputs if HIGH (all other inputs must be LOW).