1) For the following circuit: Is it input-complete and observable? Explain why or why not. If not, make it input-complete and observable.
2) In order to maximize throughput for a dual-rail pipelined unsigned Booth2 multiplier, the partial product generation is partitioned into two parts. The first part recodes each group of three dual-rail multiplier signals \((\text{MR}_2, \text{MR}_1, \text{MR}_0)\) into a dual-rail signal, \(S\), and a quad-rail select signal, \(\text{sel}\). \(S = 0\) if the partial product is positive; and \(S = 1\) if the partial product is negative. \(\text{sel} = 0\) if the partial product is \(+0\); \(\text{sel} = 1\) if the partial product is \(\pm MD\); \(\text{sel} = 2\) if the partial product is \(\pm 2MD\); and \(\text{sel} = 3\) if the partial product is \(-0\). These two signals, \(S\) and \(\text{sel}\), are then used as inputs to the second part, along with the dual-rail multiplicand signals, \(MD_i\) and \(MD_{i-1}\), to generate the corresponding partial product bit, \(PP_i\). The circuitry to generate \(PP_i\) is shown below.

\[\text{a)}\text{ Is this circuit input-complete with respect to any of its inputs? Explain.}\]

\[\text{b)}\text{ Is this circuit observable? Explain. If not, make it observable, but do not change its input-completeness or increase its worse-case delay.}\]