Problem Analysis

The goal is to design a combinational circuit that activates the alarm (LOW) only when the ignition is on (HIGH) and at least one seat is occupied while its respective seatbelt is not fastened. The inputs include: DRIV and PASS (HIGH when seats are occupied), IGN (HIGH when the car starts), and BELTD/BELTP (LOW when the belt is unfastened). The output is ALARM, which goes LOW when the conditions are met. If the ignition is off, the alarm remains off. If a seat is empty, the status of its belt does not matter. The main logic condition is: Alarm ON = IGN HIGH AND (Driver ON with BELTD LOW OR Passenger ON with BELTP LOW).