DC Lab session-3

- **When coming to the lab, bring a small notebook for noting down the practical results**.

Aim: To introduce the following (i) Five integrated circuits (ii) Designing of two circuits to represent two different systems.

Part-1:

Consider the following integrated circuits: CD4001, CD4011, CD4070, CD4077, and CD4081. Each of these integrated circuits contains four identical logic gates, with each gate having two inputs and one output. These four gates are interconnected as illustrated below.
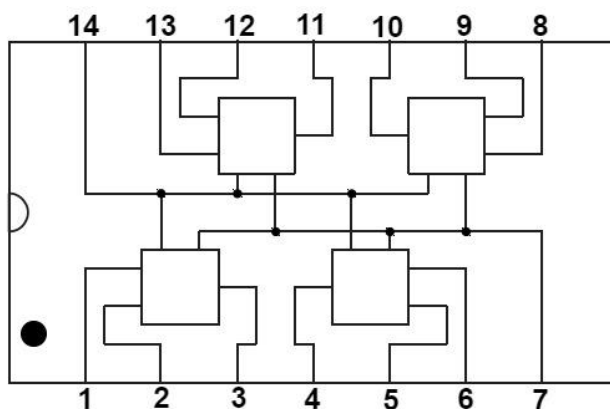

Fig.1: Layout of Integrated Circuit

[Input pins: 1,2,5,6,8,9,12,13; Output pins: 3,4,10,11; Ground pin: 7; Vcc pin: 14]

Tasks:

Make a circuit using the ICs which pin diagrams are as shown in Fig.1 and complete the table below to identify the type of logic gate represented by each integrated circuit.

Table1:

Integrated Circuit	CD4001	CD4011	CD4070	CD4077	CD4081
Type of Gate					

Part-2:

Assume there are three sensors in a car named S1, S2, and S3, with the following functions:

- Sensor S1 produces a logical 1 when the seat belt is fastened.
- Sensor S2 produces a logical 1 when the engine is not running.
- Sensor S3 produces a logical 1 when no weight is detected on the seat.

The system is designed to activate a warning signal (an LED) when the seat belt is not fastened. [Assume that LED is connected to the output].

[Consider above problem as a realistic situation]

Tasks:

(i) Prepare a truth table for the system with the above functionality of sensors.

Table2:

Sensor S1	Sensor S1	Sensor S1	Output Y (Warning Signal at LED)
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.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.

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(ii) Write a Boolean equation that represents the relationship between the system's output and the signals produced by the sensors.

(iii) Implement a circuit on a breadboard that represents the system. This circuit should utilize the same components which are tested in part 1.