**Name of the Experiment:**

**Design and construct a two bit parallel adder/subtractor circuit using IC 7483A and logic gates**

**Theory:** An adder-subtractor circuit is a circuit that takes two binary numbers as input along with two more extra bits that act as a command for either adding the two numbers or subtracting the second number from the first number. A two bit parallel adder-subtractor takes two 2-bit binary numbers in the input (along with the extra bits) and shows the result of either the addition or subtraction as three bits in the output.

In this experiment we will construct a two bit parallel adder/subtractor circuit that has six logical inputs in total (A\_1,A\_0,B\_1,B\_0,ADD,SUB) and three logical outputs (Count/S\_2,S\_1,S\_0). For this purpose, we will use an IC 7483A (four bit parallel adder), AND gates, OR gates and NOT gates. We will construct the circuit as shown in figure (6a).

**Instruments:**

1. Trainer Board,
2. Connecting wires,
3. IC’s: IC-7483A (4-bit parallel adder), IC-7432 (OR gates), IC-7408 (AND gates), IC-7404 (NOT gates).

**Procedure:**

1. First, we placed the IC’s on the bread board of the trainer board. The IC’s were placed on the gap(s) of the bread board so that all the pins were disconnected to each other.
2. Then we connected +5V source and 0V ground voltage to each IC’s corresponding pins.
3. Next, we connected the six switches (inputs) and three small red bulbs (outputs) with the IC’s such that the connection was equivalent to the circuit in figure (6b).
4. Then we used the six switches to determine the values of the outputs for different values of the inputs. We wrote down these values in the truth table.

**Result:**

//Truth Tables.

**Discussion:** Through the whole experiment we designed a two bit parallel adder/subtractor circuit and understood it’s functions. However, we faced some problems while doing the experiment. To construct the circuit we needed four specific IC’s in total. But we received a wrong IC and it took us some time to find out which IC was the wrong one. We analyzed the output’s from all the IC’s to find if each of the IC’s is working properly. This way we successfully found the wrong IC and continued with a new correct one.