*EXPT NO. : 9*

**AIM:**

To design and implement a BCD adder using IC 7483 and other logic gates.

**APPARATUS REQUIRED:**

| Sl. No. | COMPONENT | SPECIFICATION | QTY. |
|---|---|---|---|
| 1. | 4-BIT BINARY FULL ADDER | IC 7483 | 2 |
| 2. | AND GATE | IC 7408 | 1 |
| 3. | OR GATE | IC 7432 | 1 |
| 4. | BREAD BOARD | - | 1 |
| 5. | PATCH CORDS | - | - |
| 6. | POWER SUPPLY WITH LOGIC PROBE | - | 1 |

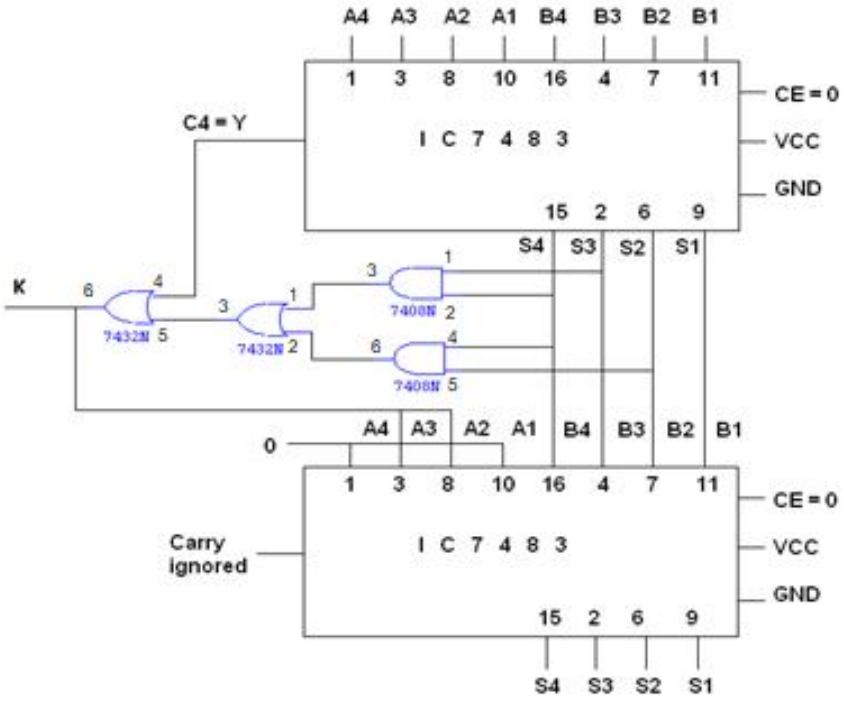
**THEORY:**

A BCD adder considers the arithmetic addition of two decimal digits in BCD, together with an input carry from a previous stage. Since each input digit does not exceed 9, the output sum cannot be greater than 19, the 1 in the sum being an input carry. The output of two decimal digits must be represented in BCD and should appear in the form listed in the columns. The 2 decimal digits, together with the input carry, are first added in the top 4-bit adder to produce the binary sum. An overflow detection circuit is used (to check if the 'Sum' of the BCD digit has exceeded 9).

**SAMPLE TABLE:**

| $A_1$ | $A_2$ | $A_3$ | $A_4$ | $B_1$ | $B_2$ | $B_3$ | $B_4$ | $S_1$ | $S_2$ | $S_3$ | $S_4$ | $C_4$ | $S_1$ | $S_2$ | $S_3$ | $S_4$ | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |

**LOGIC DIAGRAM:** **BCD ADDER**




**PROCEDURE:**

(i) Connections are given as per circuit diagram.

(ii) Logical inputs are given as per circuit diagram.

(iii) Observe the output and verify the truth table.

**OBSERVATION TABLE:**

| $A_1$ | $A_2$ | $A_3$ | $A_4$ | $B_1$ | $B_2$ | $B_3$ | $B_4$ | $S_1$ | $S_2$ | $S_3$ | $S_4$ | $C_4$ | $S_1$ | $S_2$ | $S_3$ | $S_4$ | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | |