EC 39003 (Digital Electronic Circuits Lab)	**End-Semester Laboratory Test, 2020**
Dept. of Electronics and Electrical Comm. Engineering	**IIT Kharagpur**
Wednesday batch Full Marks: 30	**Time: 1 Hour Date: 18.11.2020**

Submit Test answer script and Circuit file on Moodle. Name both files as **"ROLL_Number_BD1.pdf"** and **"ROLL_Number_BD1.CKT"**.

* Please stick to deadline. **Unnecessary delay in submission time stamp of circuit file will attract penalty.**

Report should consist of the following items.

1. Name (in CAPITAL)
2. Roll Number
3. Problem statement (**BD1= , BD2=[0:MC], MC=**)
4. Circuit Diagram
5. Discussion

OBJECTIVE:

Implement and **simulate** (in **Circuit Maker** software) a **BCD (binary-coded decimal) adder** that adds two single-digit BCD numbers **BD1** and **BD2** with proper **correction**.

Let "**p**" be the least significant decimal digit of your Roll number. Then

$$\begin{aligned} \mathbf{BD1} &= \mathbf{9 - p} \quad (\text{if } 0 \le p \le 2) \\ &= \mathbf{p + 4} \quad (\text{if } 3 \le p \le 5) \\ &= \mathbf{p} \quad (\text{otherwise}) \end{aligned}$$

Whereas, **BD2** will be the output of an **up-counter** which counts from 0 up to the maximum count **MC**, such that

$$\begin{aligned} \mathbf{MC} &= \mathbf{BD1 + 5} \quad (\text{if } BD1 \le 4) \\ &= \mathbf{BD1} \quad (\text{otherwise}) \end{aligned}$$

You are allowed to use only **IC 7493** as the up-counter.

Display the result at (slow clock speed) at each step on **7-segment (common anode) LED**.