

INDIAN INSTITUTE OF TECHNOLOGY PATNA

CS226- Lab 10 (sequential Design)

**Q1:** Design a 2-bit counter that behaves according to the two control inputs C0 and C1 as follows. C0, C1 = 0,0: Stop counting; C0, C1 = 0,1: count up by one; C0, C1 = 1,0: count down by one; C0, C1 = 1,1: count by two.

Implement using D-FF, SR-FF, T-FF and J-K flip flops.( Show the design in the document).

Names your files as L10Q1\_SR.circ, L10Q1\_JK.circ, L10Q1\_T.circ, L10Q1\_D.circ). **Design the above in paper before doing the simulation. Submit your paper work including k-map simplification (scan copy) .**

40 points

**Q2:** Design 8 bit adder using a single Full adder ( Use shift registers and full adder). A and B are the inputs and Y is the output.

20 points

**Q3: Design a 4 bit counter using two 2-bit counters. Use may use extra logic.**

**Design the above in paper before doing the experiment. Submit your paper work (submit scan copy) and \*.circ files in single zip folder with name your roll number. Submit to:**

<https://my.pcloud.com/publink/show?code=kZqY8xkZmPq9ebC8i94rhDeEmrxVgfSw5RoV>

**submit on or before :24<sup>th</sup> April 10 AM.**