

IIT GUWAHATI, DEPT OF CSE

CS221: Digital Design : Examination of Module 5 (Lec 22-26)

Date : 31st Oct 2020, Timing : 9.00AM to 9.45AM

Total Mark: 20 ()

Submission Procedure: Submit PDF scan copy of handwritten answer sheet (mention your name and roll no in the sheet) to MS Team course examination link before 9.50AM of 29th October 2020

1. **[8 Marks]** A XY flip-flop has four operations: clear to 1, no change, complement, and set to 0, when inputs X and Y are 00, 01, 10, and 11, respectively.
 - a) Tabulate the characteristic table of the XY flip-flop.
 - b) Derive the characteristic equation of the XY flip-flop.
 - c) Design the XY flip-flop given a D flip-flop. If require draw a neat diagram to support your explanation.
 - d) Show how the XY flip-flop can be converted to a D flip-flop. If require draw a neat diagram to support your explanation.
2. **[6 Marks]** Design a 3 bit register which supports (a) reset to 000, (b) set to 111, (c) retain the older value, (d) right shift with rotate bit and (e) parallel out. Explain your design and If require draw a neat dagram to explain your design.
3. **[6 Marks]** Design a counter with T flip flops which count 7, 6, 5, 4, 3, 0 and repeat. Explain your design and require draw a neat dagram to explain your design.