

Jaypee Institute of Information Technology, Noida

T2 Examination, ODD Semester 2018

B. Tech. 3<sup>rd</sup> Semester

Course Name: Digital Electronics

Max Time: 1 Hr

Course Code: 15B11EC312

Max Marks: 20

Note: Attempt all the questions. Assume suitable data, if necessary.

- Q1. Design a combinational logic circuit that can perform 4-bit Excess-3 addition. (03)
- Q2. Realize the following function  $F(A, B, C) = \overline{A}\overline{B} + ABC + \overline{A}BC$  by using all 2x1 multiplexer. Use A and/or C as selection line(s). (04)
- Q3. The truth table for XY Flip-flop is given below. Design and draw schematic diagram using D Flip-flop and any additional logic to implement it. (03)

$X_n$	$Y_n$	$Q_{n+1}$
0	0	$\overline{Q_n}$
1	0	$Q_n$
0	1	1
1	1	0

- Q4. Design a 3-bit bi-directional shift register. Explain its working with suitable sequence as an example. (03)
- Q5. a) Write comparison between asynchronous and synchronous sequential circuit. (01)
- b) Design MOD 5 up/down ripple counter using JK Flip-flop(s). (02)
- Q6. Define lock out condition. Design a synchronous counter which generates following sequence. Avoid lock out condition while designing the counter. Use T Flip-flop(s). Also, draw its waveform at each Flip-flop output for 6 clock cycles. (04)

4 → 6 → 7 → 3 → 2 → 4 → .....