

رقم الشعبة: 2

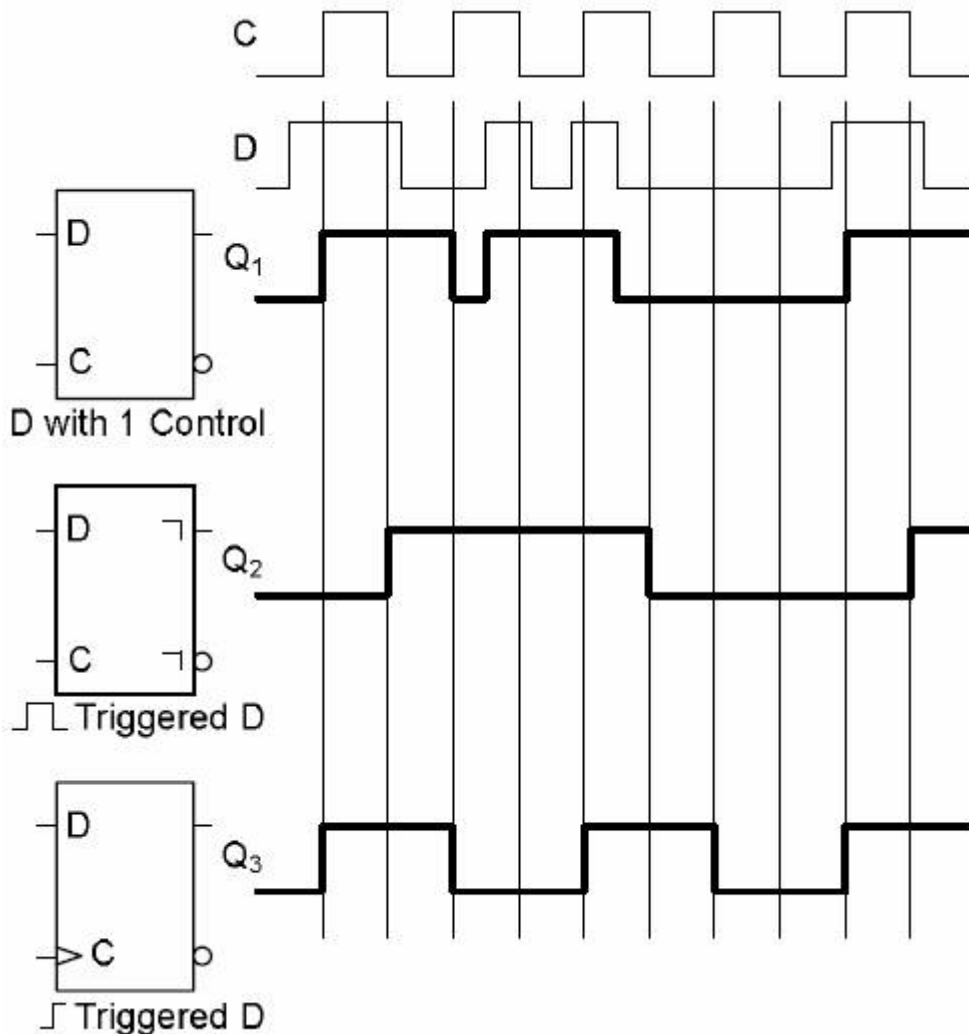
رقم التسجيل:

الاسم:

Instructions: Time 20 minutes. Closed books and notes. No calculators. **No questions are allowed.**

Q1. Clock and D waveforms, one latch and two flip-flops are shown in the figure below. For the latch and each of the flip-flops, carefully sketch the output waveform, Q_i , obtained in response to the input waveforms. Assume that the propagation delay of the storage elements is negligible. Initially, all storage elements store 0.

<3 marks>



Q2. A sequential circuit has three D flip-flops A , B , and C , and one input X . The circuit is described by the following input equations:

$$D_A = (\bar{B}C + \bar{B}\bar{C})X + (B\bar{C} + \bar{B}C)X$$

$$D_B = \bar{A}$$

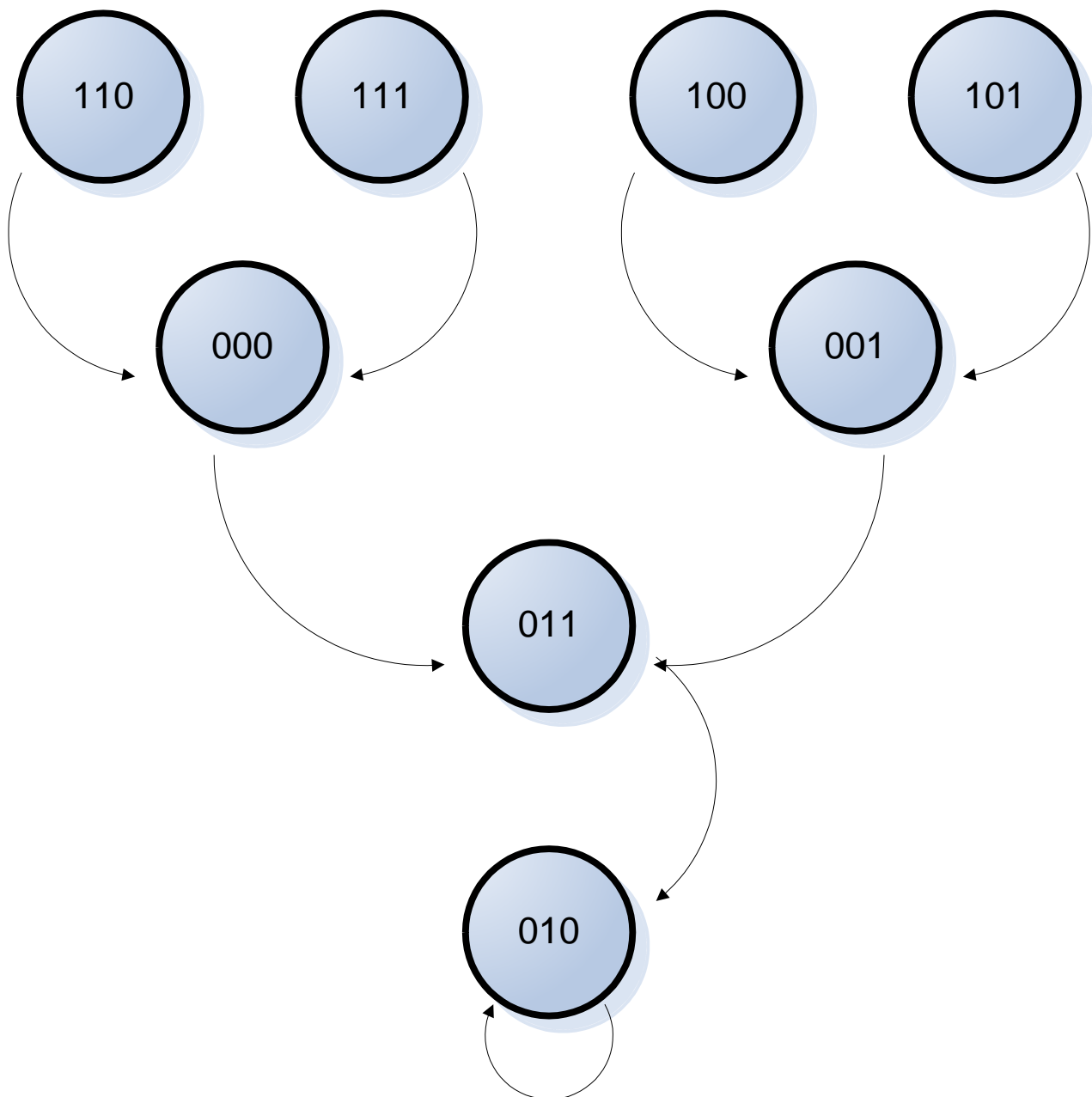
$$D_C = \bar{B}$$

- Derive the state table for the circuit.
- Derive two state diagram, one for $X=0$ and the other for $X=1$.

<3 marks>

Present State			Next State (X=0)			Next State (X=1)		
A	B	C	A	B	C	A	B	C
0	0	0	0	1	1	1	1	1
0	0	1	0	1	1	1	1	1
0	1	0	0	1	0	1	1	0
0	1	1	0	1	0	0	1	0
1	0	0	0	0	1	1	0	1
1	0	1	0	0	1	1	0	1
1	1	0	0	0	0	1	0	0
1	1	1	0	0	0	0	0	0

X=0



X=1

