DELD – Tutorial 5

ECED SVNIT

Question - 1

- Write down the given expression in Canonical SOP Form.

$$Y = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + AB\overline{C}\,\overline{D} + \overline{A}\,B\overline{C}\,\overline{D} + A\overline{B}\,\overline{C}D + \overline{A}\,BCD + ABCD + ABC\overline{D}$$

Question - 2

- Represent the given expression in Canonical POS Form.

$$Y = (A + B + C + \bar{D})(A + B + \bar{C} + D)(A + B + \bar{C} + \bar{D})$$
$$(A + \bar{B} + C + D)(A + \bar{B} + \bar{C} + D)(\bar{A} + B + C + D)$$
$$(\bar{A} + B + \bar{C} + D)(\bar{A} + B + \bar{C} + \bar{D})(\bar{A} + \bar{B} + C + \bar{D})$$

Concept of Minterms & Maxterms

| Variable				Miniterm	Maxterm
A	B	C	D	m_i	M_i
0	0	0	0	$\bar{A}\bar{B}\bar{C}\bar{D} = m_0$	$A + B + C + D = M_0$
0	0	0	1	$\bar{A}\bar{B}\bar{C}D = m_1$	$A + B + C + \bar{D} = M_1$
0	0	1	0	$\bar{A}\bar{B}C\bar{D} = m_2$	$A + B + \bar{C} + D = M_2$
0	0	1	1	$\bar{A}\bar{B}CD = m_3$	$A + B + \bar{C} + \bar{D} = M_3$
0	1	0	0	$\bar{A}B\bar{C}\bar{D} = m_4$	$A + \bar{B} + C + D = M_4$
0	1	0	1	$\bar{A}B\bar{C}D = m_5$	$A + \bar{B} + C + \bar{D} = M_5$
0	1	1	0	$\bar{A}BC\bar{D} = m_6$	$A + \bar{B} + \bar{C} + D = M_6$
0	1	1	1	$\bar{A}BCD = m_7$	$A + \bar{B} + \bar{C} + \bar{D} = M_7$
1	0	0	0	$A\bar{B}\bar{C}\bar{D} = m_8$	$\bar{A} + B + C + D = M_8$
1	0	0	1	$A\bar{B}\bar{C}D = m_9$	$\bar{A} + B + C + \bar{D} = M_9$
1	0	1	0	$A\bar{B}C\bar{D} = m_{10}$	$\bar{A} + B + \bar{C} + D = M_{10}$
1	0	1	1	$A\bar{B}CD = m_{11}$	$\bar{A} + B + \bar{C} + \bar{D} = M_{11}$
1	1	0	0	$AB\bar{C}\bar{D} = m_{12}$	$\bar{A} + \bar{B} + C + D = M_{12}$
1	1	0	1	$AB\bar{C}D = m_{13}$	$\bar{A} + \bar{B} + C + \bar{D} = M_{13}$
1	1	1	0	$ABC\bar{D} = m_{14}$	$\bar{A} + \bar{B} + \bar{C} + D = M_{14}$
1	1	1	1	$ABCD = m_{15}$	$\bar{A} + \bar{B} + \bar{C} + \bar{D} = M_{15}$

Question - 3
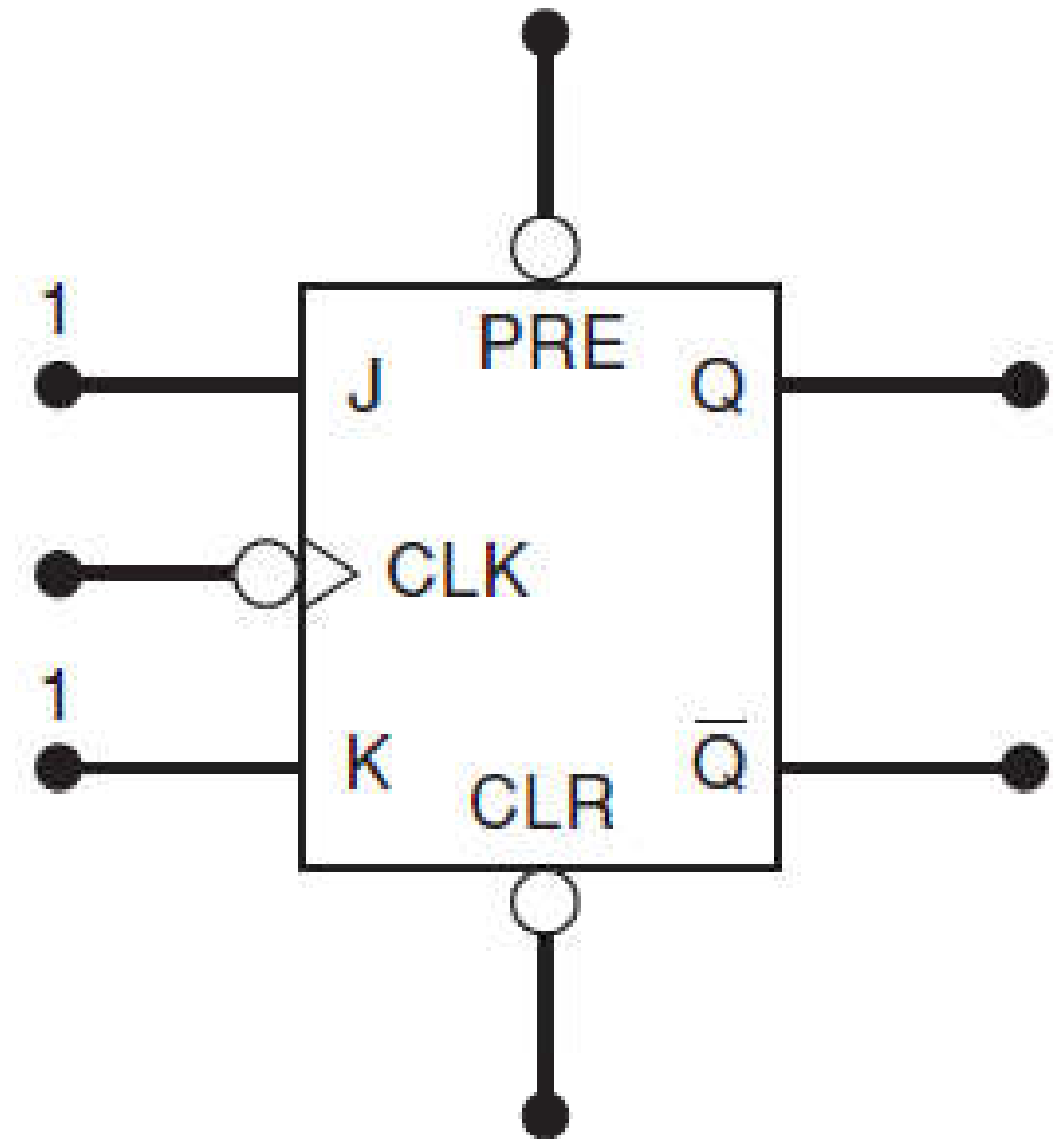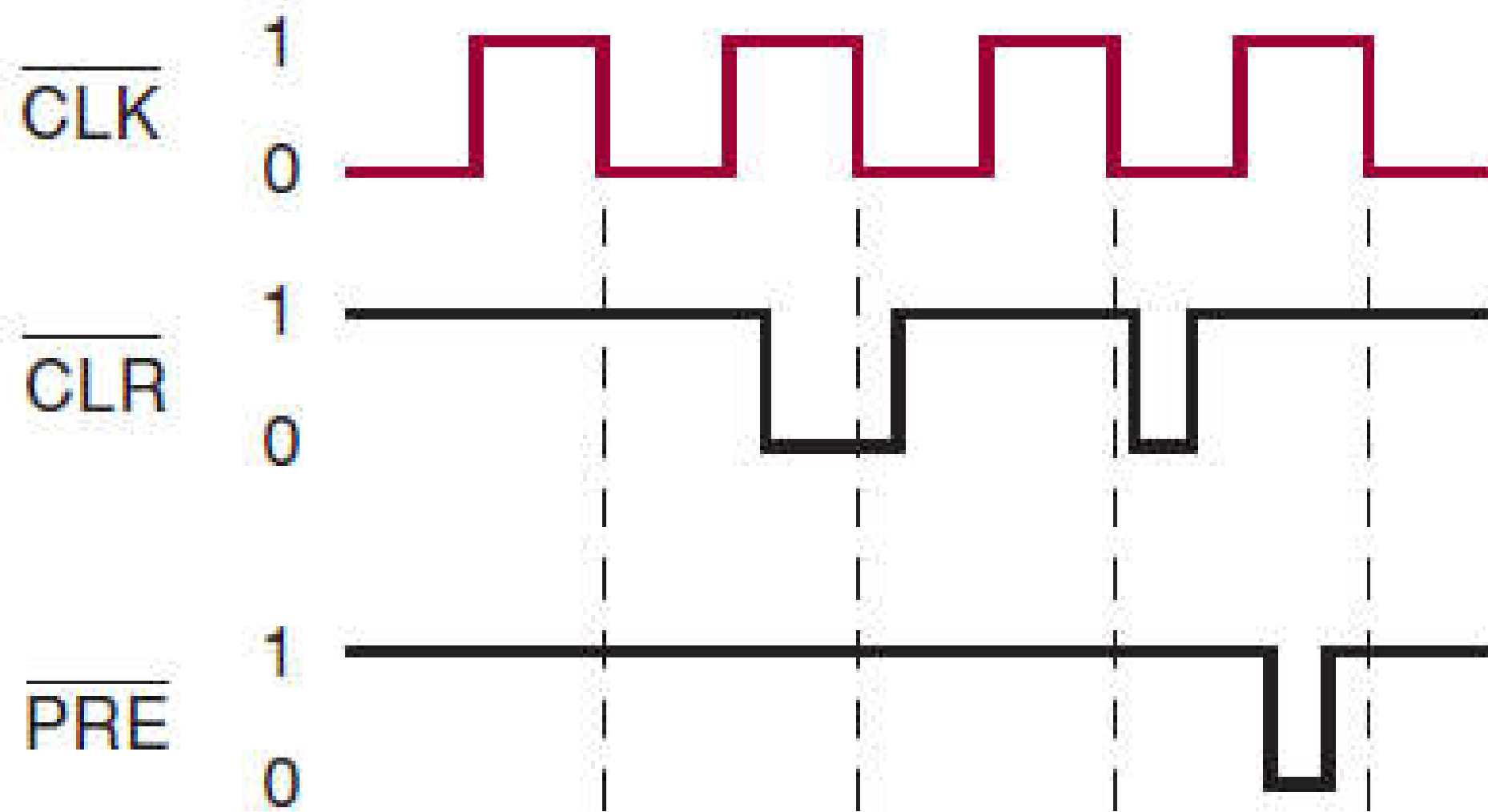
- Sketch the output Waveform. Assume Q=0 initially.
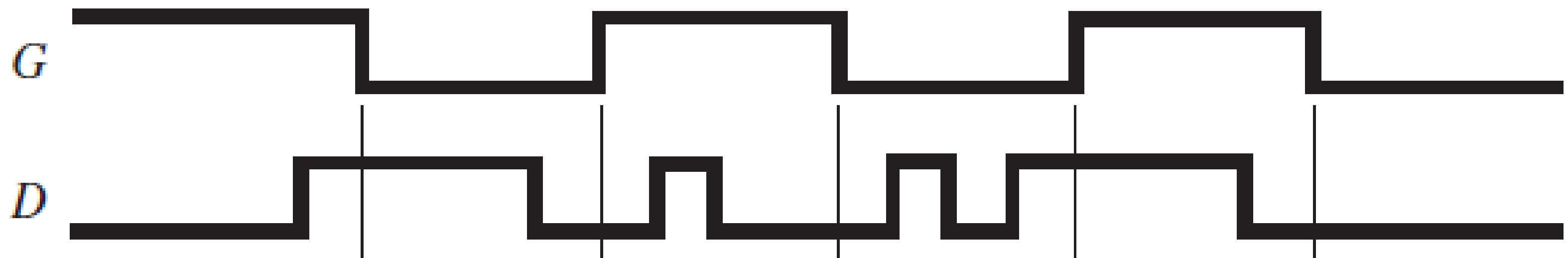
Question - 4

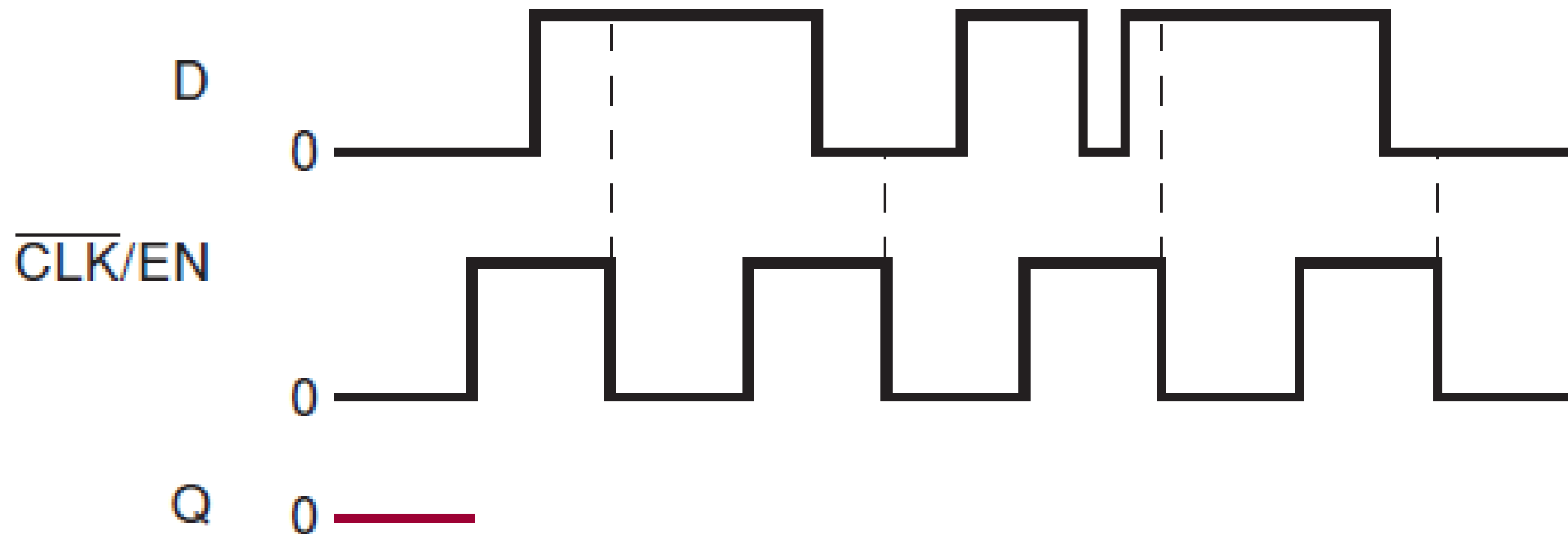- Assuming Q=0 initially, Predict and draw the output waveform.
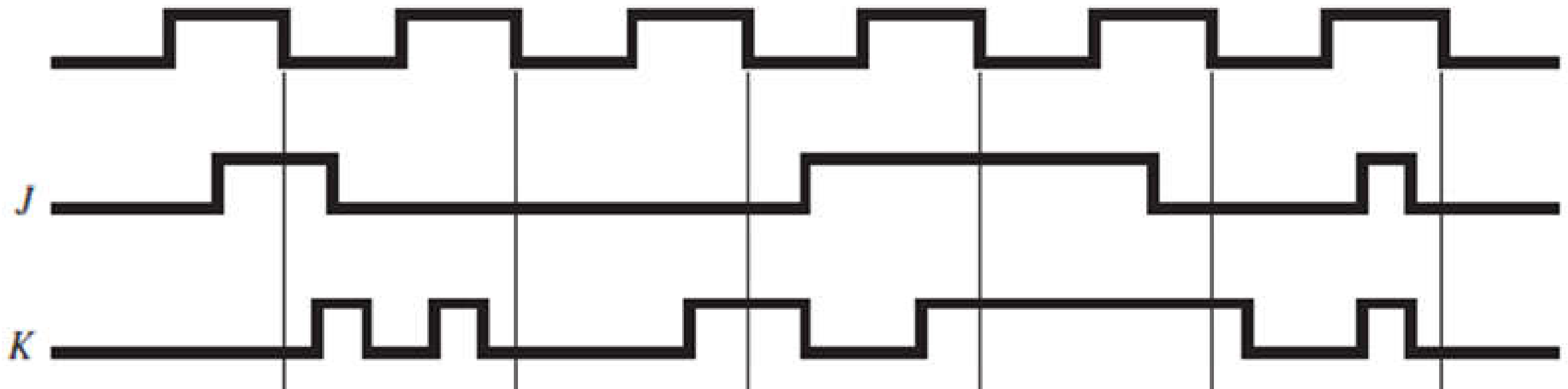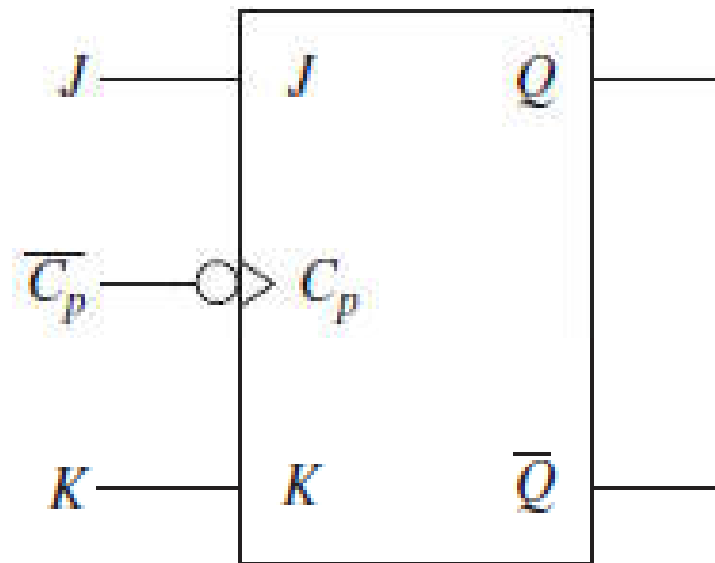
Question - 5

- Assuming Q=0, Predict and draw the Output Waveform.

Question - 6

- Predict and Draw the Output for D Latch and D-FF

To Be Continued...