A. 4-bit up-counter transition table with JK input values

Present State				Next State & JK values											
$Q_i(3)$	$Q_i(2)$	$Q_i(1)$	$Q_i(0)$	$Q_{i+1}(3)$	J(3)	K(3)	$Q_{i+1}(2)$	J(2)	K(2)	$Q_{i+1}(1)$	J(1)	K(1)	$Q_{i+1}(0)$	J(0)	K(0)
0	0	0	0	0	0	x	0	0	x	0	0	x	1	1	x
0	0	0	1	0	0	x	0	0	x	1	1	x	0	x	1
0	0	1	0	0	0	x	0	0	x	1	x	0	1	1	x
0	0	1	1	0	0	x	1	1	x	0	x	1	0	x	1
0	1	0	0	0	0	x	1	x	0	0	0	x	1	1	x
0	1	0	1	0	0	x	1	x	0	1	1	x	0	x	1
0	1	1	0	0	0	x	1	x	0	1	x	0	1	1	x
0	1	1	1	1	1	x	0	x	1	0	x	1	0	x	1
1	0	0	0	1	x	0	0	0	x	0	0	x	1	1	x
1	0	0	1	1	x	0	0	0	x	1	1	x	0	x	1
1	0	1	0	1	x	0	0	0	x	1	x	0	1	1	x
1	0	1	1	1	x	0	1	1	x	0	x	1	0	x	1
1	1	0	0	1	x	0	1	x	0	0	0	x	1	1	x
1	1	0	1	1	x	0	1	x	0	1	1	x	0	x	1
1	1	1	0	1	x	0	1	x	0	1	x	0	1	1	x
1	1	1	1	0	x	1	0	x	1	0	x	1	0	x	1

B. Karnaugh Maps for J(3), K(3), J(2), K(2), J(1), K(1), J(0), K(0).

J(3) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	0	0	0	0
01	0	0	1	0
11	x	x	x	x
10	x	x	x	x

K(3) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	x	x	x	x
01	x	x	x	x
11	0	0	1	0
10	0	0	0	0

J(2) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	0	0	1	0
01	x	x	x	x
11	0	0	1	0
10	x	x	x	x

K(2) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	x	x	x	x
01	0	0	1	0
11	x	x	x	x
10	0	0	1	0

J(1) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	0	1	x	x
01	0	1	x	x
11	0	1	x	x
10	0	1	x	x

K(1) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	x	x	1	0
01	x	x	1	0
11	x	x	1	0
10	x	x	1	0

J(0) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	1	x	x	1
01	1	x	x	1
11	1	x	x	1
10	1	x	x	1

K(0) Q(1)Q(0)

Q(3)Q(2)	00	01	11	10
00	x	1	1	x
01	x	1	1	x
11	x	1	1	x
10	x	1	1	x