



Philadelphia University
Faculty of Engineering

Marking Scheme

Exam Paper

BSc CE

Logic Circuits (630211)

Third Quiz

First semester

Date 16/01/2020

Section 1

Weighting 6% of the module total

Lecturer:

Dr. Qadri Hamarsheh

Coordinator:

Dr. Qadri Hamarsheh

Internal Examiner:

Eng. Anis Nazer

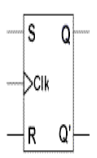
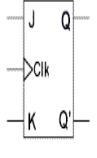
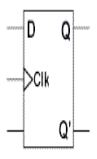
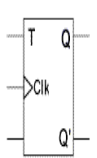
Marking Scheme Logic Circuits (630211)

Marking Assignments

Question 1

(6 marks)

Solution

FLIP-FLOP NAME	FLIP-FLOP SYMBOL	CHARACTERISTIC TABLE	CHARACTERISTIC EQUATION	EXCITATION TABLE																																			
SR		<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>S</th> <th>R</th> <th>$Q_{(next)}$</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>Q</td></tr> <tr><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>?</td></tr> </tbody> </table>	S	R	$Q_{(next)}$	0	0	Q	0	1	0	1	0	1	1	1	?	$Q_{(next)} = S + R'Q$ $SR = 0$	<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>Q</th> <th>$Q_{(next)}$</th> <th>S</th> <th>R</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>X</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>X</td><td>0</td></tr> </tbody> </table>	Q	$Q_{(next)}$	S	R	0	0	0	X	0	1	1	0	1	0	0	1	1	1	X	0
S	R	$Q_{(next)}$																																					
0	0	Q																																					
0	1	0																																					
1	0	1																																					
1	1	?																																					
Q	$Q_{(next)}$	S	R																																				
0	0	0	X																																				
0	1	1	0																																				
1	0	0	1																																				
1	1	X	0																																				
JK		<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>J</th> <th>K</th> <th>$Q_{(next)}$</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>Q</td></tr> <tr><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>Q'</td></tr> </tbody> </table>	J	K	$Q_{(next)}$	0	0	Q	0	1	0	1	0	1	1	1	Q'	$Q_{(next)} = JQ' + K'Q$	<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>Q</th> <th>$Q_{(next)}$</th> <th>J</th> <th>K</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>X</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>X</td></tr> <tr><td>1</td><td>0</td><td>X</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>X</td><td>0</td></tr> </tbody> </table>	Q	$Q_{(next)}$	J	K	0	0	0	X	0	1	1	X	1	0	X	1	1	1	X	0
J	K	$Q_{(next)}$																																					
0	0	Q																																					
0	1	0																																					
1	0	1																																					
1	1	Q'																																					
Q	$Q_{(next)}$	J	K																																				
0	0	0	X																																				
0	1	1	X																																				
1	0	X	1																																				
1	1	X	0																																				
D		<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>D</th> <th>$Q_{(next)}$</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td></tr> </tbody> </table>	D	$Q_{(next)}$	0	0	1	1	$Q_{(next)} = D$	<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>Q</th> <th>$Q_{(next)}$</th> <th>D</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	Q	$Q_{(next)}$	D	0	0	0	0	1	1	1	0	0	1	1	1														
D	$Q_{(next)}$																																						
0	0																																						
1	1																																						
Q	$Q_{(next)}$	D																																					
0	0	0																																					
0	1	1																																					
1	0	0																																					
1	1	1																																					
T		<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>T</th> <th>$Q_{(next)}$</th> </tr> </thead> <tbody> <tr><td>0</td><td>Q</td></tr> <tr><td>1</td><td>Q'</td></tr> </tbody> </table>	T	$Q_{(next)}$	0	Q	1	Q'	$Q_{(next)} = TQ' + T'Q$	<table border="1" style="margin: auto;"> <thead> <tr style="background-color: #c8e6c9;"> <th>Q</th> <th>$Q_{(next)}$</th> <th>T</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td></tr> </tbody> </table>	Q	$Q_{(next)}$	T	0	0	0	0	1	1	1	0	1	1	1	0														
T	$Q_{(next)}$																																						
0	Q																																						
1	Q'																																						
Q	$Q_{(next)}$	T																																					
0	0	0																																					
0	1	1																																					
1	0	1																																					
1	1	0																																					