

King Saud University  
Electrical Engineering Department

EE\_208: HW#2

10

Name:

Number:

Due Date: 16-April (Tuesday)

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Q.1: Design a digital converter circuit which converts BCD to Gray Code. Use don't care conditions as indicated in the truth table below.(hint: complete the **truth table** and use **k-map** to find the **Boolean expressions** then **draw the logic diagram**). (5 marks)

BCD code				Gray Code			
A	B	C	D	w	x	y	z
0	0	0	0				
0	0	0	1				
0	0	1	0				
0	0	1	1				
0	1	0	0				
0	1	0	1				
0	1	1	0				
0	1	1	1				
1	0	0	0				
1	0	0	1				
1	0	1	0	X	X	X	X
1	0	1	1	X	X	X	X
1	1	0	0	X	X	X	X
1	1	0	1	X	X	X	X
1	1	1	0	X	X	X	X
1	1	1	1	X	X	X	X

Q.2: design a 4-bit by 2 multiplier (5 marks)

a- Derive the Boolean expressions of the full adder (FA) and draw its logic diagram (2 marks)

A	B	C	S	C
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

b- Using the FA. Unit, build a 4-bit adder (1 mark)

c- Design the 4-bit by 2-bit multiplier using 4-bit adders with logic gates (2 marks)