Name：_____ Student number：_____ SCORE: _____

Homework 3

1. Show how the following expressions can be implemented as stated using only NAND gates:

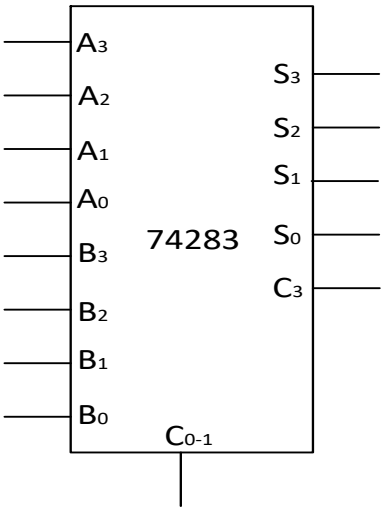
（a）$X = ABC$ （b）$Y = \overline{AB} + \overline{CD}$

2. A 74HC147 encoder has LOW levels on pins 2, 5, and 12. What BCD code appears on the outputs if all the other inputs are HIGH?

3. Show the logic required to convert a 10-bit binary number to Gray code and use that logic to convert the following binary numbers to Gray code:
   (a) 1010111100
   (b) 1111000011

4. Please convert the 2421BCD codes to 5421BCD codes using the 74283 adder. Give analysis procedure and draw a conversion circuit on the adder derectly.

2421BCD 码				5421BCD 码			
D	C	B	A	D	C	B	A
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	0	0	0	1	0
0	0	1	1	0	0	1	1
0	1	0	0	0	1	0	0
1	0	1	1	1	0	0	0
1	1	0	0	1	0	0	1
1	1	0	1	1	0	1	0
1	1	1	0	1	0	1	1
1	1	1	1	1	1	0	0



5. Implement the logic function

$$F=A\overline{B}D+\overline{A}B\overline{C}D+BC+\overline{B}C\overline{D}$$

（1）Use 74LS138s and NAND gates

（2）Use 74HC151 and other logic gates necessary