國立臺北科技大學 103 學年度碩士班招生考試

系所組別：2240 電子工程系碩士班丁組

第二節　數位邏輯設計　試題

注意事項：

1. 本試題共五題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、Convert the following decimal numbers to their hexadecimal equivalents.

1. $(709)_{10}$ (5%)
2. $(1889)_{10}$ (5%)
3. $(4095)_{10}$ (5%)
4. $(4096)_{10}$ (5%)

二、Suppose you wish to design a circuit that indicates when at least three out of four inputs are HIGH. The circuit has four inputs, D_3,D_2,D_1,D_0 and an active-HIGH output, Y. Write the Boolean expression for the circuit and draw the logic circuit. (20%)

三、Write the Boolean expression describing an 8 to 1 multiplexer. Evaluate the equation for the case where input D_5 is selected. (20%)

四、Draw a timing diagram for a NOR latch showing each of the following sequences of events:

1. S and R are both HIGH, S goes LOW before R. (5%)
2. S and R are both HIGH, R goes LOW before S. (5%)
3. S and R are both HIGH, S and R go LOW simultaneously. (5%)
4. State why S=R=1 is a forbidden state for the NOR latch. (5%)

五、Design a synchronous mod-10 counter, using positive edge-triggered D flip-flops. Check that unused states properly enter the main sequence. Draw a state diagram showing the unused states. (20%)