**長庚大學資訊工程系 計算機組織隨堂練習 2013/09/23**

考試範圍：數位電路課程全部

考試時間：3:10 PM– 4:00PM

考試規則：可翻閱參考資料，3:40後開放討論

1. You are asked to design a lighting controller. Figure 1 shows an application scenario of the lighting controller. The controller may be applied to control a light bulb at the middle of a long hall. Two buttons *A* and *B* are placed at the two ends of the long hall. When a user walking through the hall, one may press a button on one end to turn on the light and press the button on the other end to turn off the light when one leaves. The circuit framework of the controller is shown in Figure 2. You are given a button controller that generates a one-cycle logic-1 pulse each time a button is pressed. A logic-1 on output L keeps the light bulb ON. Please draw the circuit diagram to realize the controller. (50%)



Figure 1.



Figure 2.

1. You are asked to draw a timing waveform for a given circuit. The circuit is shown in Figure 3. Please complete the waveform in Figure 4. (50%)



Figure 3



Figure 4