系別：電機工程學系　　　　科目：計算機概論(含計算機組織)

准帶項目請打「ˇ」	
X	簡單型計算機

本試題共　1　頁

1. In a small or embedded system, "watchdog" is an important component,
   (a) Please specify its function (5%),
   (b) What kinds of methodologies can implement the watchdog? (5%)

2. "Snoopy" protocol is a mechanism for multiprocessors systems. Please specify why or where snoopy protocol is used. (10%)

3. "Parity Check" and "CRC (Cyclic Redundancy Check)" are two major error checking algorithms for data transmission. Please explain more briefly the operations of these two error checking mechanisms. (10 %)

4. Blocks of data move between different memory spaces have to consider the copy direction. Like DF (direction flag) in 80x86 CPU, it controls the direction of data copy. Please explain why this flag is important? (10%)

5. Booth's Algorithm is one mechanism to implement the circuit of multiplication. Please explain the functions of Booth's algorithm by example (-2) * 3 = -6. Show your calculation step-by-step. (10%)

6. Interrupt-driven I/O and DMA (Direct Memory Access) are two ways to increase the utilization of a CPU, and ISR (Interrupt Service Routine) is used to handle an interrupt.
   (a) Please explain how a CPU gets the ISR address when an interrupt be triggered? (7%)
   (b) Please explain more briefly the function and operation of "DMA"? (8%)

7. When the input to a combinational circuit changes, "Hazard", unwanted switching transients may appear in the output.
   (a) Please explain "Hazard" using following circuit (Fig. 1)? (8%)
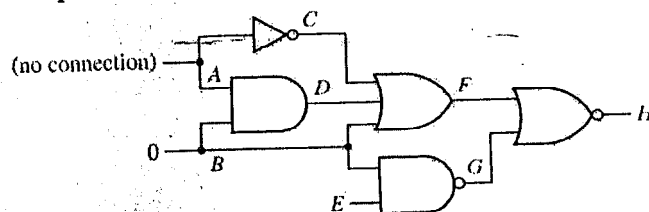   (b) How to solve this problem in Fig. 1? (7%)

Fig. 1

8. There are situations in pipelining when the next instruction cannot execute in the following clock cycle. These events are called "Pipeline Hazard". Please explain following types of hazards clearly and also describe the relative solutions for these hazards.
   (a) Structural Hazard (7%)
   (b) Control Hazard (7%)
   (c) Data Hazard (6%)