

國立臺灣科技大學  
九十一學年度碩士班招生考試試題

系所組別：電子工程系甲組  
科目：計算機組織

(總分 100 分)

1. Explain the following concepts: (25%)
  - (1) Delayed Branch,
  - (2) Instruction Set Architecture,
  - (3) Load-store Machine,
  - (4) Superscalar,
  - (5) Direct Memory Access.
  
2. (1) Show both the structural and behavioral descriptions by using Verilog or VHSIC HDL for a full adder. (10%)
  - (2) What are the major computer design levels? (5%)
  - (3) According to (2), show the primitive components for each design level. (10%)
  
3. (1) Based on the IEEE 754 standard, show the binary floating-point representation for the decimal numbers, 1.5 and  $-5$ , in single precision. (5%)
  - (2) Based on (1), add the decimal numbers 1.5 and  $-5$  in binary form using a floating-point addition algorithm. (10%)
  - (3) Based on (1), multiply the decimal numbers 1.5 and  $-5$  in binary form using a floating-point multiplication algorithm. (10%)
  
4. Consider the problem of designing a processor for computing the sum of  $N$  16-bit unsigned numbers, where  $N$  is even. Without caring about overflow, design the processor with two 16-bit adders to compute the sum in  $(N/2)+2$  cycles.
  - (1) Design an input/output interface for the processor. (5%)
  - (2) Design the processor at the RTL level. (10%)
  
5. Show the SRAM and DRAM 1-bit cells in MOS technology. (10%)

