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|  | **Ho Chi Minh City University of Technology**  **Department of Electrical and Electronics Engineering** | | |
| **FINAL EXAMINATION**  Grading: 40% | | | **Computer System Engineering**  Course ID: 407406 |
| **Date: 7 Aug, 2018** | | | **Duration:** 90 minutes |
| **Student name:**  **Student ID:** | | | **Examiner’s name & signature:** |
| **Score:** | | Students are allowed to use *one A4 page with two sides* for reference.  Books and other documents are not allowed to use. | |
| **This examination consists of 4 pages** | |

**Problem 1:** (20pts) Answer the following questions

1. How many bit of word size and data path does the 8086 processor have?

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1. Suppose that you discover that RAM addresses 00A50000 to 00A67FFF are reserved for a PC video adapter. How many bytes of memory is this? How many bit for this address is it?

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1. What are advantages and disadvantages of secondary memory?

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1. In an 8086 program, the segment:offset address is 235F:42E1. Find the five-digit address:

1. Assume that we have the memory content as below.

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| Address | 0x0 | 0x1 | 02 | 0x3 |
| Content | 35 | 2A | 4E | F9 |

What are the 32-bit data when we read a double-word at the address 0x0 with Little Endian mode?

**Problem 2:** (20pts) Answer the value of registers after the instruction is executed.

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| **No.** | **Before** | **Instruction** | **After** |
| 1 | AX: F2 8C | mov AL, 23h | **AX:** |
| 2 | ECX: 00 43 FC 5A  Value: 00 00 00 00 | mov value, ecx | **ECX:**  **value:** |
| 3 | BX: 02 3E  CX: FF FF | add BX CX | **BX:**  **CX:**  **SF: ZF: CF: OF:** |
| 4 | AX: 7F FF | sub AX, 200 | **AX:**  **SF: ZF: OF:** |
| 5 | EAX: FF FF FF E2  Double: FF FF FF D1 | imul eax, Double | **EAX:**  **CF: OF:** |

**Problem 3:** (10pts) Write 80x86 assembly language code for the following C procedure:

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| **C procedure** | **ASM procedure**  *Assume that S is stored in EAX, num is store in EBX, i is stored in ECX* |
| int my\_func(int a)  {  int S=0;  while( a > 2 )  {  S++;  a-= 2;  }  return S;  } | **my\_func:** |

**Problem 4:** (10pts) Write 80x86 assembly language code for the following C function.

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| int arith(int x, int y, int z)  {  int t1 = x+z;  int t2 = y+t1;  int t3 = x+9;  int t4 = y \* 24;  int t5 = t3 + t4;  int rval = t2 \* t5;  return rval;  } | arith: |

**Problem 5:** (10pts) Write an 80x86 assembly language program to compute F = 9\*a + 3\*b\*c + 2. Assume that:

* a is stored in register EAX
* b is stored in register EBX
* c is stored in register ECX
* F is stored in register EDX

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**Problem 6:**  (10pts) Describe the interrupt processing flow?

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**Problem 7:**  (10pts) What are differences between interrupt and exception?

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**Problem 8:** (10pts) Draw a circuit to demonstrate an external interrupt of 8088 processor through the pin INTR with the interrupt vector FAh using buffer IC LS244.

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*Lecturer*

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*Dr. Truong QuangVinh*