CmpE213 – HW4 8051 Instruction Set

Due: Thursday Oct. 16, 2003
Show your work for full credit.

1. Write an instruction (or set of instructions) to:

   (a) Exchange the value of the accumulator with the value in R3.

   (b) Set the current register bank to bank 1 (be careful - is the PSW bit-addressable?).

   (c) Jump backward 31H bytes if the carry flag is set.

   (d) Clear the accumulator using only a 1-byte instruction.

   (e) Increment the value of the DPTR.

   (f) Jump forward 19H bytes if the accumulator is not equal to 1BH.

   (g) Perform a bit-wise logical XOR between the hits in the accumulator and the bits at
       internal memory location 42H.

   (h) Push the value #65H onto the stack.

   (i) Decrement the value of R1 and jump forward 17 bytes if the result is not zero.

2. Different, addressing modes can he used to accomplish the same result. For each addressing
   mode (direct, indirect, immediate, register), write an instruction that loads the accumulator
   with the value #65H. For each instruction, list precisely which addressing modes are used.
   For instance, MOV 2AH, #42 uses direct and immediate.

3. Assume you are to write a jump instruction that will be at address 4170H in code space.
   Show a jump instruction for each addressing mode (relative, absolute, long) that jumps to
   code memory location 400BH. Give the opcode for each instruction.

4. For the following code.

```
start:      MOV 2AH, #5
            MOV RO, #80H
            CLR A
loop:       MOV @R0, A
            INC R0
            DJNZ 2AH,loop
stop:       JMP stop
```

   a) Find the final value of any registers or memory changed by executing this code segment.

   b) Find the number of bytes in code memory this instruction sequence occupies.

   c) Find the number of instruction cycles, machine cycles, clock cycles and total amount of
   time this code takes to complete (assume it's complete when it hits JMP stop). Assume the
   clock is running at 12 MHz.

d) Explain why this code does not change the value of special function registers PO, SP, DPL, etc., located at internal memory locations 80H, 81H, etc.

e) Write the machine code and corresponding code memory locations for the above code segment (use a table). Assume that code memory starts at 0000H.

5. Problem 30 in Chapter 3 of ISM. Assume a 12 MHz clock.