

## CSE 3215: Microcontroller Based System Design

### Assignment 1

Time: 20 minutes

Marks: 10

1. State the contents of the RAM locations in 8051 after the following program. [1.5]

|              |
|--------------|
| SETB PSW.3   |
| SETB PSW.4   |
| MOV R3, #12H |
| MOV R5, #13H |
| MOV R6, #10H |
| MOV R7, #20H |
| MOV R1, #22H |

2. Analyze the stack for the LCALL instructions in the following program. [4]

|         |        |        |                |
|---------|--------|--------|----------------|
| 0000    |        | ORG    | 0              |
| 0000    | 7455   | BACK:  | MOV A, #55H    |
| ..... * | F590   |        | MOV P1, AFB    |
| ..... * | FB22   |        | MOV R3, #22H   |
| ..... * | 7A25   |        | MOV R2, #25H   |
| ..... * | 120300 |        | LCALL DELAY    |
| ..... * | 74AA   |        | MOV A, #0AAH   |
| ..... * | F590   |        | MOV P1, A      |
| ..... * | 120300 |        | LCALL DELAY    |
| ..... * | 80EC   |        | SJMP BACK      |
|         |        |        |                |
| 0500    |        | ORG    | 500H           |
| ..... * | C003   | DELAY: | PUSH 3         |
| ..... * | C002   |        | PUSH 2         |
| ..... * | 7BFF   |        | MOV R3, 0FFH   |
| ..... * | 7AFF   | NEXT:  | MOV R2, 0FFH   |
| ..... * | DAFE   | AGAIN: | DJNZ R2, AGAIN |
| ..... * | DBFA   |        | DJNZ R3, NEXT  |
| ..... * | D002   |        | POP2           |
| ..... * | D003   |        | POP3           |
| ..... * | 22     |        | RET            |
| ..... * |        |        | END            |

3. Write the instructions required to add -7 and -4. Show the [1.5]  
value of the status register's V, N, S and P flags.
4. Find the ROM memory address, on-chip ROM in bytes and ROM [3]  
organization of each of the following AVR chips.  
    ATtiny32  
    ATmega256

