**CSE 3215: Microcontroller Based System Design**

**Assignment 1**

**Time: 20 minutes**

**Marks: 10**

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| 1. | State the contents of the RAM locations in 8051 after the following program.   |  |  | | --- | --- | |  | Solution: | | |  | | --- | | SETB PSW.3 | | SETB PSW.4 | | MOV R3, #12H | | MOV R5, #13H | | MOV R6, #10H | | MOV R7, #20H | | MOV R1, #22H | | |  |  | | --- | --- | | 1FH | 20H | | 1EH | 10H | | 1DH | 13H | | 1CH |  | | 1BH | 12H | | 1AH |  | | 19H | 22H | | 18H |  | | | [1.5] |
| 2. | Analyze the stack for the LCALL instructions in the following program. Solution:   |  |  |  |  | | --- | --- | --- | --- | | 0000 |  | ORG | 0 | | 0000 | 7455 | BACK: | MOV A,#55H | | 0002 | F590 |  | MOV P1,AFB | | 0004 | FB22 |  | MOV R3,#22H | | 0006 | 7A25 |  | MOV R2,#25H | | 0008 | 120300 |  | LCALL DELAY | | 000B | 74AA |  | MOV A,#0AAH | | 000D | F590 |  | MOV P1,A | | 000F | 120300 |  | LCALL DELAY | | 0012 | 80EC |  | SJMP BACK | |  |  |  |  | | 0500 |  | 0RG | 500H | | 0500 | C003 | DELAY: | PUSH 3 | | 0502 | C002 |  | PUSH 2 | | 0504 | 7BFF |  | MOV R3, 0FFH | | 0506 | 7AFF | NEXT: | MOV R2, 0FFH | | **0508** | DAFE | AGAIN: | DJNZ R2, AGAIN | | 050A | DBFA |  | DJNZ R3, NEXT | | 050C | D002 |  | POP2 | | 050E | D003 |  | POP3 | | 0510 | 22 |  | RET | | 0511 |  |  | END |  |  |  | | --- | --- | | Stack: | Program Counter: (After RET) | | |  |  | | --- | --- | | 09 | 00 | | 08 | 0B | | |  |  | | --- | --- | | PCH | PCL | | 00 | 0B | |   \*\*Explain with your own words | [4] |
| 3. | Write the instructions required to add -7 and -4. Show the value of the status register’s V, N, S and P flags.  Solution:  111110101  V=0  N=1  S=1  P=0 | [1.5] |
| 4. | Find the ROM memory address, on-chip ROM in bytes and ROM organization of each of the following AVR chips.  ATtiny32  ATmega256  Solution:  ATtiny32:  Range: 00000 – 03FFF  On-chip ROM: 32KB  ROM organization: 16K \* 2bytes  ATmega256:  Range: 00000 – 1FFFF  On-chip ROM: 256KB  ROM organization: 128K \* 2bytes | [3] |