| Reg. No. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

# Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

## V SEMESTER B.TECH (MECHATRONICS ENGINEERING)

## END SEMESTER EXAMINATIONS, DEC 2015/JAN 2016

SUBJECT: MICROCONTROLLER & APPLICATIONS [ECE 351]

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

- Answer **ANY FIVE FULL** the questions.
- Missing data may be suitably assumed.

**1A.** Explain the role of Program Counter in fetching and executing a program in ROM, depending on the Opcode and Operand for each instruction. Demonstrate it by considering any small program. **3**

**1B.** Assume that 5 BCD data items are stored in RAM locations starting at 60H, as shown below. Write a program to find the sum of all the numbers. The result must be in BCD and subtract it from 3FH, store the final output at 02DH. **5**

60=(37), 61=(65), 62=(11), 63=(71), 64=(59)

**1C.** How many bytes are set aside by each of following directives ? also State the contents of memory locations 200H-205H for the following: **2**

```
        ORG 0200H
MY_DATA: DB “ABC123”
```

**2A.** Write a program to get the x value from P1 and send $x^2$ TO P3, continuously using indexed addressing mode. **3**

**2B.** Write PUSH instructions to push the contents of the register on stack after the execution of the following set of instructions and indicate the final values at the stack. **3**

```
MOV SP, #49H
SETB PSW.3
MOV R0, # 25H
MOV R2, # 0CH
MOV R5, # 08H
MOV A, # 0CEH
```

**2C.** Define Baud rate. Explain about Asynchronous Serial Communication and data framing in ASCII. **4**

| | | |
|---|---|---|
| **3A.** | Write a program in which 12bytes of data stored in RAM locations starting from 6EH are transferred serially. At the end of data transfer, the last value at R0 is displayed on P2 after a delay of 2sec same will be displayed on P3. Assume that XTAL=11.0592 MHz. set the baud rate at 19200 . | **7** |
| **3B.** | Discuss on the working of Edge-triggered and Level-triggered interrupts in detail. | **3** |
| **4A.** | Consider a DAC0808 interfaced with 8051, write a program to generate a staircase waveform at the DAC output. | **6** |
| **4B.** | Elucidate the concepts of Clock Cycle and Instruction Pipelining in PIC microcontroller with a neat diagram. | **4** |
| **5A.** | Write a program to create a square wave that has a high portion of 1085µs and a low portion of 15µs. assume XTAL=11.0592MHz. use Timer1. | **6** |
| **5B.** | Explain main 4 addressing modes of 8051 with proper syntax and examples. | **4** |
| **6A.** | Write a program for each of the following and indicate the status of the OV flag for each.<br>a). (+25H)+(+34H)<br>b). (-127)+(+127) | **3** |
| **6B.** | Show the design of an 8031-based system connection to 8K bytes of program ROM and 8K bytes of data ROM with the starting address of 1000H. | **4** |
| **6C.** | With the suitable sketch explain the 8255 control word format. | **3** |