Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VI Examination-Nov/Dec-2011

Subject code: 162402 **Date: 23/11/2011**
Subject Name: Microprocessor for Power Electronics
Time: 10.30 am -1.00 pm **Total marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** State basic functions of Arithmetic unit. Draw neat diagram of simple arithmetic unit containing these functions. Also mention a function table of this unit. **07**

(b) Draw internal block diagram of basic 8051 microcontroller. **07**

Q.2 **(a)** Explain instruction DJNZ. Write a program to multiply two numbers stored in registers R0 and R1 by using DJNZ. **07**

(b) State the similarities and differences between following instructions. **07**
1. MOVX A, @R0 and MOV A, @R0
2. ADD A, @R1 and ADD A, R1

OR

(b) State the similarities and differences between following instructions. **07**
1. SJMP and LJMP
2. ANL A, #0x03 and ANL A,03

Q.3 **(a)** State the function carried out by following program segment. **07**

```
ORG 0x0100
        SETB PSW.4
        SETB PSW.3
        MOV 0x18,#0xFF
        XRL  A,R0
        INC A
END
```

Find out the data in Registers A, PSW, R0, PC, Internal RAM location 0x18 after execution of the program segment. (Assume [A] = 0x3F, data in other registers/MLs are same as at RESET of microcontroller before execution of program segment.)

(b) What is subroutine? **07**
State the sequence of steps taken by the 8051 when an instruction for 'calling' a subroutine is executed.

OR

Q.3 **(a)** State five directives of assembler. State meaning of any two directives. **07**

(b) What is interrupt? Which are the various interrupt sources available in 8051? State vector locations of these interrupts. Briefly explain why interrupt can be considered as 'Hardware Generated CALL'. **07**

Q.4 **(a)** An 8 bit number (smaller than 100_{10}) is stored in Accumulator. Write a subroutine to convert it into packed BCD form in accumulator. Program must contain appropriate comments. **07**

(b) A data array of 8 bit data is stored in external RAM. The length of the array is 16. The memory location of first data is 0x20. Write a subroutine to copy the data to memory locations starting at 0x20 in internal RAM. **07**

OR

Q.4 **(a)** Write a C program to multiply two 16 bit numbers. **07**

(b) Write a C program to add four 32 bit numbers. **07**

Q.5 **(a)** Draw neat diagram for interfacing 4 Common Cathode displays with 8051. Also state seven segment code table for displaying 0-9 digits on the display. What should be the seven segment code to make the display 'BLANK'? **07**

(b) 1. Draw neat diagram of hardware for interfacing 16 keys with the 8051 microcontroller. **07**

2. If, you have 8 microcontroller pins free for interfacing key board, maximum how many keys can be interfaced? Justify your answer.

OR

Q.5 **(a)** State various types of Analog to Digital Converters and Digital to Analog converters. **07**

(b) Explain concept of serial communication. List out various standards of serial communication. **07**