Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
Diploma Engineering - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 362001   **Date: 09/05/2013**
Subject Name: Microcontrollers
Time: 10:30 am TO 01:00 pm   **Total Marks: 70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **English version is considered to be Authentic.**

Q.1 (a) Draw the hardware block diagram of microcontroller and explain function
             of each block.   **07**
         (b) Explain the operation of following instruction.   **07**
             (i)   ADDC A,@Ri
             (ii)   RL A
             (iii) MOVC A,@A + DPTR
             (iv)   XCHD A,@Ri
             (v)   JNC target
             (vi)   ACALL Addr11
             (vii) CJNE A,#data, target

Q.2
         (a) (i)   Explain the TMOD (Timer Mode) register with function of each
                    bit.   **05**
             (ii)   What is the function of SBUF register in serial communication?

                                                                                     02

         (b) Draw the interfacing of LCD with 8051 based microcontroller and explain
             in brief the function of RS, R/W and EN pins of and LCD display.

                                                                                     07

OR
         (b) Explain the various addressing mode used in 8051 microcontroller for
             accessing memory.   **07**

Q.3
         (a) Explain the function of each bit of special function register PSW (Program
             Status Word).   **07**
         (b) (i)   Explain microcontroller is a true computer on chip.   **03**
             (ii)   What is the function of RST (Pin No 9) and PSEN (Pin No 29) of
                    8051 microcontroller.   **4**
OR
Q.3 (a) Explain function of XTAL 2 (Pin No 18) and XTAL 1 (Pin No 19). Find
             the machine cycle for (i) XTAL=11.0592MHz (ii) XTAL=16MHz.

                                                                                     07

         (b) (i)   What is the function of ALE (Pin No 30) and EA (Pin No 31) of
                    Microcontroller 8051?   **04**
             (ii)   List 16 bit data register of 8051 microcontroller and their function. **03**

Q.4
         (a) Draw timer/counter logic diagram of 8051 microcontroller and explain   **07**
             timer modes.
         (b) (i)   Write a program to transfer the message "HELLO" serially at 9600
                    baud rate, 8 bit data, 1 stop bit, XTAL=11.0592. Do this

                                                                                     1

			continuously.	**06**
		(ii)	Who provides the clock pulses to 8051 timers if C/T =0?	**01**

<div align="center">**OR**</div>

Q. 4 (a) (i) Draw the interfacing diagram of external (8k x 8) program ROM with 8051 microcontroller. **05**

(ii) What address in the interrupt vector table is assigned to the INT1 and TIMER1 interrupts? **02**

(b) (i) What is stack and stack pointer? Explain PUSH and POP operation. **06**

(ii) How many timers do we have in the 8051? **01**

Q.5

(a) (i) Write a program to add data stored at RAM memory location 40H and 41H and store lower byte of result at RAM location 42H and higher byte of result at RAM location 43H. **04**

(ii) Write a program to divide data in internal RAM location 45H by data byte 12H. Put quotient in RAM location 40H and remainder in 41H. **03**

(b) What is subroutine? Describe this term using CALL instruction. What is difference between ACALL and LCALL instruction? **07**

<div align="center">**OR**</div>

Q.5 (a) (i) Write a program to decrement DPTR from any initialized value to 0000H. **04**

(ii) Write a program to load register R7 by data from external memory location A030H. **03**

(b) Write a program to generate 10KHz frequency square wave on P2.0. Assume the XTAL=11.0592MHz **07**

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