GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V • EXAMINATION – WINTER 2013

Subject Code: 151001   **Date: 27-11-2013**

Subject Name: Microcontroller and Interfacing

Time: 10.30 am - 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.**

Q.1 **(a)** Answer the following questions   **07**
       (1) What is assembler directive? Explain any two assembly directives.
       (2) What is the difference between Harvard and Von-Neumann architecture?
       (3) What is the purpose of EA pin in 8051 microcontroller?
       (4) Write any two difference between microprocessor and microcontroller
       (5) What is the function of DPTR in 8051 microcontroller?
       (6) What is content of PC and SP after RESET condition in 8051?
       (7) What is the difference between 8031 and 89C51 microcontroller IC?

      (b) Draw the internal architecture of 8051 microcontroller and explain each block in detail   **07**

Q.2 **(a)** Explain TCON and TMOD Special function register (SFR) in detail   **07**
      (b) Explain functions of following pins in 51 family microcontroller   **07**
         (1) $\overline{PSEN}$ (2) $\overline{EA}$ (3) ALE (4) T0 (5) RxD (6) $\overline{INT0}$ (7) $\overline{WR}$

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

      (b) Explain following instructions of 51 family microcontroller   **07**
       (1) DAA (2) DEC A (3) RRC A (4) DEC @R0 (5) ADDC A,R7
       (6) SETB C (7) SWAP A

Q.3 **(a)** Consider that switch is connected with port pin P3.2 in pull-up configuration so that when it is pressed logic at P3.2 is 0 and 1 otherwise. 8 LEDs are connected with Port P0 using common anode configuration. Draw interfacing circuit diagram for above requirements. Write program to monitor the switch. If switch is pressed, all LEDs should glow and if switch is not pressed all LEDs should be OFF. Check switch continuously.   **07**

      (b) Interface LCD with 8051 microcontroller. Connect data lines with port P0, control lines with any three port pins of port P1. Write program to display message 'Microcontroller" on the first line and "Interfacing" on the second line.   **07**

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

Q.3 **(a)** Consider that common anode seven segment display is connected with port P0 and switch is interfaced at port pin P1.0 of 8051 microcontroller. Draw interfacing diagram. Write assembly language program to monitor the switch. If switch is pressed, display "0" on common anode display and if switch is not pressed display "1" on common anode display.   **07**

      (b) Write program to generate square wave of 1 KHz on port pin P1.7. Use timer generated delay by timer 0 in mode 0. Consider crystal frequency 12 MHz.   **07**

Q.4 **(a)** Explain serial data transmission and reception. Write steps required for serial data transmission using 8051   **07**

      (b) Write program to transmit message "GTU EXAM 2013" using serial port of 8051 at baud rate 9600   **07**

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

Q.4 **(a)** Write program to receive 16 data bytes from computer to microcontroller 8051 **07** through serial port. Store data from memory location 0400h onwards.

(b) Explain how timer 1 can be used as 16 bit counter to count external pulses **07** which are given at pin T1. Write program to count external pulses and save it in register R6 and R7.

Q.5 **(a)** Explain interfacing of DC motor with 8051 using IC L293D. Write program to **07** rotate motor in clockwise as well as anticlockwise direction.

(b) Draw circuit diagram to interface stepper motor with 8051. Write program to **07** rotate motor in clockwise direction using half step mode.

OR

Q.5 **(a)** Explain interfacing of RTC with 8051 microcontroller. Write program to get **07** values of hour, minute and second from RTC to RAM locations 80h, 81h and 82h respectively

(b) Explain interfacing of External 32K EPROM and 16K RAM with 8051. Draw **07** circuit diagram.

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