Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: 151001 **Date: 11-06-2014**

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) Explain the 8051 architecture with block diagram. **07**

(b) Explain following instructions of 51 family microcontroller **07**
(1) CJNE reg,#data (2) DEC A (3) RRC A (4) DEC @R0 (5) ADDC A,R7
(6) SETB C (7) ANL C,bit

Q.2 (a) Explain Serial data transmission modes in detail. **07**

(b) Explain functions of following pins in 51 family microcontroller **07**
(1) $\overline{PSEN}$ (2) $\overline{EA}$ (3)ALE (4) RST (5) TxD (6) T1 (7) $\overline{WR}$

OR

(b) What are the interrupts available in the 8051 microcontroller? Explain interrupt enable (IE) SFR and Interrupt priority (IP) SFR. **07**

Q.3 (a) Explain various modes of timers in 8051 and explain with assembly language programming auto reload mode. **07**

(b) Write an assembly program to find frequency of signal connected at P3.4. Assume XTAL = 12MHz. Use Timer 0 as a counter, and Timer 1 as time base of 1 sec. **07**

OR

Q.3 (a) Write a C program using interrupts to do the following: **07**
(i) Generate a 2000 Hz frequency on P2.1 using T0 8 bit auto reload,
(ii) The pulse train is connected to P3.5. Use timer 1 as an event counter to count up a 1-Hz pulse and display it on P0.
Assume that XTAL=12 MHz.

(b) Write an 8051 C program to calculate the checksum bye for given data. Six bytes of hexadecimal data: AAh, 72h, 3Ah, and 1Fh,45h,CDh. **07**

Q.4 (a) With interfacing diagram explain seven segment interfacing with 8051 and write a program to display 0 to 9 with appropriate delay between the display of the subsequent digits. **07**

(b) Write an assembly as well as C program to transfer the message "ELECTION" serially at 2400 buad, 8-bit data, 1 stop bit. Perform this program for 25 times. **07**

OR

Q.4 (a) Explain with necessary sketch, interfacing the LCD with 8051 and write a C program to Display "WELCOME" in the first line and in centre of the 16X2 line display. **07**

(b) Explain interfacing of RTC with 8051 microcontroller. Write program to get values of hour, minute and second from RTC to RAM locations 60h, 61h and 62h respectively. **07**

Q.5 (a) Explain interfacing of External 16K EPROM and 16K RAM with 8051. Draw circuit diagram. **07**

(b) Write a program to interface a unipolar stepper motor, by 64° in clockwise direction. Assume the motor has a step angle of 2°. Use the 4 – step sequence. **07**

Q.5 (a) Write a program for speed control of DC motor using PWM. **07**

(b) Explain 8051 interfacing with ADC 0804 in self clocking mode. **07**

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