Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER V • EXAMINATION – WINTER - 2012

Subject code: 151001 **Date: 11-01-2013**

Subject Name: Microcontroller and Interfacing

Time: 02:30 pm to 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Consider crystal frequency as 11.0592 MHz**

Q.1 **(a)** 1. List the factors to be considered for selection of microcontroller for particular application. **03**

2. State the difference between Control and Conditional flag. Explain flag register of 8051 microcontroller. **04**

(b) 1. Explain register direct and register indirect addressing mode of 8051 with an example. **03**

2. Explain following in brief. **04**
(i) RISC (ii) Assembler Directive

Q.2 **(a)** 1. Explain following 8051 instructions with an example. **04**
(i) MOVX (ii) ANL C, /Bit (iii) CJNE (iv) DIV

2. Describe the functions of following 8051 pins. **03**
(i) XTAL1 (ii) ALE (iii) RxD

(b) Explain PC and DPTR with their significance. Write program to interchange contents of PC and DPTR. **07**

OR

(b) Explain in detail of timer operation in mode-2. Write program to generate delay of 0.25 mS using timer-1 in mode-2. Show necessary calculation. **07**

Q.3 **(a)** Explain in detail the structure and operation of port P0 of the 8051 microcontroller. **07**

(b) Write short note on following. **07**
1. Intel Hex File Format
2. Data types of Embedded C.

OR

Q.3 **(a)** Explain following with respect to 8051 microcontroller interrupt. **07**
1. List the sequence of events that take place when an interrupt occurs.
2. Priority level of various interrupts with their vector addresses.
3. Explain with an example how their priority altered.

(b) Write short note on following SFR. **07**
1. TCON
2. SCON

Q.4 **(a)** Write an assembly language program for 8051 to find frequency (in Hz) of the external pulse train connected at port pin P3.4. Show necessary calculation. **07**

(b) Write an Embedded C program for 8051 to find number of positive and negative data among Five byte of array. Send number of positive data to Port P1 and negative data to Port P2. **07**

OR

Q.4 **(a)** Write an assembly language program for 8051 using interrupt to complete **07**

following task simultaneously.

1. Read data from port P1 and send it to port P2 continuously at every 2 mS. Use timer-0 interrupt.
2. Send "A" continuously to serial COM port with 4800 baud rate, 8 bit data and 1 stop bit. Use serial interrupt.

Q.4 (b) Write an Embedded C program for 8051 using interrupt to complete following task simultaneously. **07**

1. Generate square wave of frequency 4 KHz on port pin P1.0. Use timer-0 interrupt.
2. Generate square wave of frequency 1 KHz on port pin P1.7. Use timer-1 interrupt.

Q.5 (a) Interface LCD with 8051 and write an assembly language program to display "MC&I" at line 1, column 5. Explain with neat and clean diagram. **07**

(b) Interface three memory chips as per below details with 8051 microcontroller at address 8000H onwards. Draw neat and clean diagram. **07**

1. Chip-1, 4Kx8 bit Data ROM
2. Chip-2, 1Kx8 bit RWM
3. Chip-3, 1Kx8 bit RWM

OR

Q.5 (a) Interface DAC with 8051 microcontroller and write an assembly language program to generate triangular waveform. Explain with neat and clean diagram. **07**

(b) Write short note on following. **07**

1. DS12887 RTC interfacing with 8051
2. DC motor control with optoisolator

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