Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 710302N **Date: 02-12-2014**

Subject Name: Advance Microcontroller

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		Draw interfacing diagram of two common cathode seven-segment LEDs connected to PIC18F452 microcontroller using PORTA and PORTB. Write an assembly language program to display a BCD number from 00 to 99 on these LEDs continuously.	**14**
Q.2	**(a)**	Two BCD arrays are stored in data registers beginning from 0x100 and 0x200 having length of 0x09. Add these numbers element wise and store the BCD results in data registers beginning from 0x300. (i.e. (0x100) + (0x200) = (0x300), (0x101) + (0x201) = (0x301), and likewise). Ignore carry if any.	**07**
	(b)	Explain following instructions with their format and appropriate example of each. (i) TBLRD*	**04**
		(ii) BTG	**03**
		OR	
	(b)	Explain following instructions with their format and appropriate example of each. (i) BTFSC	**04**
		(ii) INCF	**03**
Q.3	**(a)**	Write an assembly language program to transfer a block of data stored in data memory beginning from 0x101 to data memory beginning from 0x501. Length of this block is stored in 0x100.	**07**
	(b)	Write an assembly language program to set up the CCP1 in PWM mode to generate a pulse waveform of 20kHz with 40 percent duty cycle if the PIC18F452 microcontroller oscillator frequency is 10MHz.	**07**
		OR	
Q.3	**(a)**	Write an assembly language program to add ten data bytes stored in data memory beginning from 0x300. Store the result in data registers 0x500(LSB) and 0x501(MSB).	**07**
	(b)	The 16-bit number 0XD53B is stored in data memory locations 0x50 (LSB) and 0x51 (MSB). Multiply this number by 0x5B that is stored in data memory location 0x52. Store the product in data memory locations 0x200 (LSB) onwards	**07**
Q.4	**(a)**	Draw a schematic diagram of interfacing LM35 with PIC18F452. Explain necessary scaling (calibration) process if required. Write an assembly language program which reads temperature and displays at port D.	**07**
	(b)	Draw a schematic diagram of PIC18F452 microcontroller interfaced with DAC0808. Write an assembly language program to generate sawtooth wave.	**07**
		OR	
Q.4		Write an assembly language program to set up INT1 pin as a high priority interrupt input and set up a counter to count up to 15. Assume that pushbutton key is connected to pin INT1. Write the interrupt service routine to count the number of interrupts up to 15 generated by the key and reset the counter again.	**14**

Q.5	Draw interfacing of 8 push-button keys (K0 to K7) to PORTA and 8 common anode LEDs (LED0 to LED7) to PORTB of PIC18F452 microcontroller. Write an assembly language program that checks for a key closure, debounces multiple key contacts and displays the binary number corresponding to pressed key on LED port (e.g. if key K7 is pressed then display 0000 0111 on LED port).	**14**
	OR	
Q.5	Interface LCD with PIC 18F452 microcontroller. Write an assembly language program to display “HELLO” message on LCD.	**14**

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