Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (OLD course)• EXAMINATION – SUMMER 2015

Subject Code: 710302 **Date:12/05/2015**

Subject Name: Advance Microcontroller

Time: 10:30 am to 1:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Write appropriate comment lines in assembly language program (ALP).**

Q.1	**(a)**	Interface common anode seven segment LED to PORTB of PIC microcontroller 18F452. Write an assembly language program (ALP) to display mod 10 up-counter at an appropriate interval of 100ms.	**07**
	(b)	Write a macro named MULUNS that multiplies two numbers passed as arguments and stores the result in data memory locations 0xA40 (LSB) onwards.	**07**
Q.2	**(a)**	A push-button key is connected to interrupt (INT1) pin of PIC microcontroller 18F452. Write an ALP to set up INT1 pin as a high priority interrupt input and set up the data register 0x50 as an 8 bit counter. Write the interrupt service routine to count number of interrupts arriving on the INT1 pin when the push-button key is pressed. Display this count on LED0 to LED7 connected to PORTC.	**07**
	(b)	What do you mean by assemble directives? Discuss commonly used assembler directives to develop the programs.	**07**
		OR	
	(b)	Explain the following instructions with their format and appropriate example (i) DAW (ii) BTG (iii) SWAPF	**07**
Q.3	**(a)**	Write an assembly language program (ALP) to generate a square wave of 10kHz with 40% duty cycle on bit 0 of PORTC assuming clock frequency of 40MHz. Use DELAY subroutine in your program. Show your delay calculations.	**07**
	(b)	16 bit multiplicand is stored in data registers 0x10 (LSB) and 0x11 (MSB), 8 bit multiplier is stored in data register 0x20. Write an ALP to multiply them and store the result in data register beginning from 0x50 (LSB).	**07**
		OR	
Q.3	**(a)**	Ten data bytes are stored in program memory beginning from 0x05E6A0. Copy data bytes which are greater than 5FH to the data register beginning from 0x70.	**07**
	(b)	Add ten BCD data bytes stored in data registers beginning from 0x101. Store the result in data registers beginning from 0x500 (LSB).	**07**
Q.4	**(a)**	Write an ALP to set up the CCP1 (RC2 pin) in PWM mode to generate a pulse waveform at 10kHz with 40 percent duty cycle considering the PIC18F452 microcontroller oscillator frequency of 10 MHz. Show your calculations of PR2 count. Assume prescale of unity.	**10**
	(b)	Differentiate between Van-Neumann and Harvard architecture.	**04**
		OR	

Q.4	**(a)**	Write an ALP to measure the period of an incoming pulse waveform connected to pin RC2 of PORTC. Use CCP1 module to capture the incoming waveform with timer 1 as the clock source of the CCP1 module. Clock frequency is 10 MHz.	**10**
	(b)	Write an ALP to load data 0xAA in file register 0x125 and 0x55 in 0x225, and then exchange the data of both file registers.	**04**
Q.5		Interface 4x4 Hex keypad to PORTB of PIC18F452 microcontroller. Write an ALP to recognize a key pressed and encode the key in its binary value from 0000 to 1111. Store the encoded binary value in data register 0x70.	**14**

OR

Q.5	**(a)**	Interface DAC with PIC18F452 microcontroller. Generate a triangular waveform using this DAC. How can we change the frequency of this waveform?	**07**
	(b)	Explain interfacing and timing diagram of LCD with PIC microcontroller.	**07**

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