Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER–II EXAMINATION – SUMMER 2017

Subject Code: 2724702 **Date:26/05/2017**

Subject Name: Advanced Microcontroller And Logic Controllers

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.**

Q.1	**(a)**	Draw the pin-out diagram of microcontroller MSP430F2003 and write the functions of all pins.	**07**
	(b)	Draw the block diagram of PLC and explain the same in details.	**07**
Q.2	**(a)**	Explain memory map for MSP430 microcontrollers.	**07**
	(b)	Explain various addressing modes in MSP430 microcontrollers.	**07**
		OR	
	(b)	Give the bit pattern of status register for the MSP430 microcontroller and also explain significance of each bit.	**07**
Q.3	**(a)**	Explain Timer_A for the MSP430 microcontroller using suitable block diagram.	**07**
	(b)	Write a 'C' program for MSP430 to toggle P1.1 continuously with a software timer delay loop.	**07**
		OR	
Q.3	**(a)**	Explain serial peripheral interface for the microcontroller MSP430.	**07**
	(b)	Explain architecture of Comparator_A for MSP430 microcontroller using suitable block diagram.	**07**
Q.4	**(a)**	Draw and explain single channel DC input card for PLC.	**07**
	(b)	List various timer instructions for the PLC and explain any two of them.	**07**
		OR	
Q.4	**(a)**	List and explain various data comparison instructions for PLC.	**07**
	(b)	Explain various jump operations in PLC ladder diagrams.	**07**
Q.5	**(a)**	When a START (NO) pushbutton is pressed, a pulse output will operate. The output will remain on for 10 seconds and off for 5 seconds. This on and off sequence will continue until STOP (NC) pushbutton is pressed. Develop and draw PLC ladder diagram to operate this sequence correctly.	**07**
	(b)	Two feeder conveyors (F1 and F2) feed parts to a main conveyor (M). Both F1 and F2 are having 'NC' proximity sensor at the end. When 'NO' START pushbutton is pressed, F1 will be turned ON and after feeding 5 parts to M, F1 will be turned OFF. After waiting for 7 seconds, F2 will be turned ON and will remain in ON condition until it feeds 7 parts to M. When all 12 parts are arrived, M will be turned ON for 1 minute. If at any time 'NC' STOP pushbutton is pressed, all the outputs will be turned OFF. Design and draw ladder diagram to execute this sequence correctly.	**07**
		OR	
Q.5	**(a)**	How does PLC handle analog inputs? Explain using suitable diagrams.	**07**

(b) Design and draw a ladder diagram for the control of the following system: **07**
When digital input X is high and the value of analog output A is between 200 and 1000, a digital output B will turn on. The value of X will vary as per following equation $X= Y+2(Y+Y^2)$, where Y is another analog input.

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