GUJARAT TECHNOLOGICAL UNIVERSITY ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subj Subj Time	ect (ect] ect 2:	Code: 2724702 Date: 28/05/2 Name: Advanced Microcontrollers and Logic Controllers 30 PM – 5:00 PM Total Marks	2015 s: 70
Instru	ction 1. 2. 3.	is: Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	Describe the DAC12 data formats and offset calibration supported in MSP430 with their requirements	07
	(b)	Explain digital AC output card of PLC with suitable diagrams.	07
Q.2	(a)	Explain the use of Sample and Hold mode with switched capacitors bank for Analog to Digital Conversion	07
	(b)	On a conveyor belt, a product is passed from one end to another end. It is required to measure the time difference between two successive products for the arrival at the destination end. Describe the use of Timer in capture mode to measure this time difference.	07
	(b)	OR Describe the use of Timer for acquiring an applog signal at the compliant	07
	(0)	frequency of 200 Hz with ADC.	07
Q.3	(a)	Answer the following questions.1) Explain the use of Watchdog Timer Control Register for setting various time intervals.	07
		2) Explain the difference between POR and PUC in MSP430 along with at least two events that generates these actions.	
	(b)	Describe the use of comparator for the measurement of oil temperature.	07
		OR	
Q.3	(a)	Answer the following questions.	07
		 Describe the features of SPI bus protocol with advantages. Describe the features of LLAPT has material with advantages. 	
		2) Describe the features of UAR1 bus protocol with advantages and limitations.	
	(b)	Explain I ² C bus protocol in MSP430 using signals supported.	07
Q.4	(a)	Draw PLC ladder diagram networks for the following:	07
		(i) Two inputs NOR gate (ii) Two inputs NAND gate (iii) Two inputs X-OR gate	
	(b)	Design and draw PLC ladder diagram to control following system: The operation of a horizontal rotary kiln plant is to be controlled by a PLC. There are one air blower and one coal (in the powder form) blower at the inlet of the kiln. There is one chimney at the end of the kiln. The operating steps of the plant are as follow.	07
		- When start button is pressed, air blower will be on.	
		 Then if operator pushes the kiln start button, kiln will be on if the gate of the chimney is closed. 	

- After starting of the kiln, immediately the gate of the chimney will be opened.

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- The operator can turn off the kiln by pressing the separate kiln stop button, but at that time air blower and coal blower will remain on and gate of the chimney will also be on.
- A master stop button will stop all kiln, air blower, coal blower and chimney gate.
- In case if air blower or coal blower fails, the kiln plant must be stopped.

OR

- Q.4 (a) Explain difference between ON delay timer and Retentive on delay timer 07 instructions used in PLC programming using their timing diagram and examples.
 - (b) Two digital outputs X and Y will turn ON when a START (NO) pushbutton is pressed. When STOP (NC) pushbutton is pressed, only output Y will be stopped. Furthermore, 10 seconds after stopping of Y, another digital output Z will turn ON. Z then remains ON for 25 seconds and after that it will turn OFF. 10 seconds after stopping of Z, X will turn OFF automatically. Design and draw PLC ladder diagram to control this system.

Q.5	(a)	Explain Instruction List (IL) programming in detailed with example.	07
	(b)	Explain analog input module of PLC using suitable block diagram.	07

OR

Q.5 (a) Develop and draw PLC ladder diagram for an analog output Z where Z is varies according to following equation. In the equation, A, B, C and D are analog inputs.

Z=A+2B+2CsinD

(b) List different number comparison instructions in PLC and explain any one of 07 them with example in ladder logic diagram.
