Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1724108 Date: 25-06-2014

Subject Name: Digital Signal Processor Based Motion Control

Time: 02:30 pm - 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)**	Which family of digital signal processors are suitable for motion control application? What are the basic differences in such processor and processor designed for communication purpose ? (List at least five differences)	**07**
	(b)	For measuring linear and rotary motion which types of transducers are used ? How can they be interfaced with the digital signal processor ? Show with their characteristics and block diagram.	**07**
Q.2	**(a)**	Show functional block diagram of any one DSP controller used in motion control. Name each block properly. List the integrated peripherals used in such controllers.	**07**
	(b)	Show the memory maps of any one of the DSP controller used in motion control applications.	**07**
		OR	
	(b)	Which addressing modes are used in LF2407 controller ? Explain any of the addressing mode with suitable instruction in which it is used ?	**07**
Q.3	**(a)**	For 10 bit inbuilt ADC, with 16 individually addressable registers, how the digital value corresponding analog value can be computed for LF2407 series controller ? Show functional block diagram of such controller naming each block clearly.	**08**
	(b)	Explain the following instructions: (Any Three) (1) LACL (2) LACC (3) LDP (4) LARP (5) SPLK (6) LAR (7) SACL	**06**
		OR	
Q.3	**(a)**	Explain about I/O MUX Control Register and Data and Direction Control Register.	**08**
	(b)	Explain interrupt hierarchy in LF2407 controller.	**06**
Q.4	**(a)**	Explain IFR, IMR and PIVR with reference to interrupt structure of LF2407.	**07**
	(b)	Write a sample code which explains interrupt initialization process.	**07**
		OR	
Q.4	**(a)**	Show sample code to check for ADC peripheral interrupt flag and explain the steps.	**07**
	(b)	Show general purpose timer configuration block diagram and explain continuous up-counting mode.	**07**
Q.5	**(a)**	Write down practical steps for generating PWM using GP timer and show sample code to generate fixed duty cycle PWM.	**07**
	(b)	Show capture units and QEP circuitry for LF2407 controller.	**07**
		OR	
Q.5	**(a)**	What is the advantage of using specialized DSP controller for power converter as compared to analog controller and microcontrollers ? Explain any one scheme for power converter with DSP.	**07**
	(b)	Show with flow chart control of any one type of motor using DSP.	**07**

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