

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) **06**
 (1) LACL (2) LACC (3) LDP (4) LARP (5) SPLK (6) LAR (7) SACL
- 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**
