GUJARAT TECHNOLOGICAL UNIVERSITY
M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1724108   **Date: 14/07/2012**
Subject Name: Digital Signal Processor Based Motion Control
Time: 10:30 am – 13:00 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)**   Give specifications of any two transducers used in speed and position control   **07**
              applications in motion control.
    (b)   Show the functional block diagram of LF2407 controller and mention typical   **07**
              blocks those are used in motion control applications.

Q.2   **(a)**   Which addressing modes are used in following instructions? Explain any two   **07**
              instructions.

              (1) LACL #48H   (2) LACC #2434H (3) LDP # 0A1H

    (b)   What is the role of bit 9 to bit 11 in System Control and Status Register 1?   **07**
              What is the role of DON and PON in deciding the status of SARAM?
                                   OR
    (b)   Obtain model of the Brushless DC servomotor and show its speed torque   **07**
              characteristics.

Q.3   **(a)**   State four types of indirect addressing options in C2xx and Write a small   **07**
              program to add two numbers using assembly code of C2xx.
    (b)   Draw a block diagram showing multiplexing of a pin in LF2407. Why such   **07**
              multiplexing is necessary?
                                     OR
Q.3   **(a)**   Explain about I/O MUX control register and Data and Direction Control   **07**
              Register.
    (b)   What are the features of ADC in LF2407?   **07**

Q.4   **(a)**   Explain about ICR, IMR and PIVR of LF2407.   **07**
    (b)   Explain the steps involved in detection of hall effect signals for LF2407?   **07**
                                     OR
Q.4   **(a)**   Show the flowchart of Start/Stop Auto Sequencer Mode.   **07**
Q.4   **(b)**   Write a code to initialize ADC, setting the registers and start conversion   **07**
              process for LF2407.

Q.5   **(a)**   Write a code to generate fixed duty cycle PWM signal using C2xx assembly.   **07**
    (b)   Show the implementation scheme for BLDC motor control using LF2407.   **07**
                                   OR
Q.5   **(a)**   Draw the flowchart and write the steps for control algorithm used in control of   **07**
              BLDC motor.
    (b)   Show the steps in computation of the actual speed of the motor and write a   **07**
              code for the same.

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