Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VIII EXAMINATION – SUMMER 2016**

**Subject Code:180908** **Date:16/05/2016**

**Subject Name:Advanced Processor and Controllers (Department Elective - II)**

**Time:10:30 AM to 01:00 PM** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | Discuss various internal memory modules configured with TMS320LF2407A DSP controller. | **07** |
| | **(b)** | Sketch and explain the overall PLC System Layout and Connection. | **07** |
| **Q.2** | **(a)** | What are the different integrated peripherals available in TMS320LF2407A DSP controller? Explain any one of them in detail. | **07** |
| | **(b)** | Explain giving example, the PLC scanning function during program execution. | **07** |
| | | **OR** | |
| | **(b)** | What is LTI System? Discuss properties of LTI System. | **07** |
| **Q.3** | **(a)** | Discuss in short the various subcomponents of C2xx DSP core. | **07** |
| | **(b)** | Sketch and explain shared GPIO pin configuration along with associated registers. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain the Interrupt hierarchical levels used in TMS320LF2407A DSP through which the interrupt signal propagate along with the registers involved in the process of interrupt handling. | **07** |
| | **(b)** | Discuss in short the different components of Event Manager of TMS320LF2407A DSP controller. | **07** |
| **Q.4** | **(a)** | Compute the Convolution y(n) = x(n) * h(n) for the following signals : $h(n) = \{ 5 , 4 , 3 , 2 , 1 \}$ $\uparrow$ $x(n) = \{ 1 , 1 ,1 , 1 \}$ $\uparrow$ | **07** |
| | **(b)** | Define Z transform and list properties of Z transform. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Compute the Convolution y(n) = x(n) * h(n) for the following signals using tabulation method: $x(n) = \{ 2^n$ where $-3 \le n \le 4 \}$ $\{ 0$ elsewhere $\}$ $h(n) = \{ 1^n$ where $0 \le n \le 4\}$ $\{ 0$ elsewhere $\}$ | **07** |
| **Q.4** | **(b)** | Determine Z transform and plot the ROC for the discrete signal: $x(n) = ( -⅓)^n u(n) - ( ½ )^n u(-n -1)$ | **07** |

**Q.5** **(a)** Convert following Boolean expressions into its equivalent ladder diagram. **07**

(1)$[( P + \overline{Q} + R ) \cdot ( U + V ) \cdot \overline{W} \cdot X ] + ( S + T ) \cdot Y = Z$

(2)$\overline{( L + M + N ) + ( Q \cdot R )} \cdot R = S$

(3)$( A + B + C ) \cdot (D + E + F ) \cdot G \cdot \overline{H} = M$

**(b)** Draw the ladder diagram for the following operations: **07**

Master Control switch enable/disable all the devices.
When SW1 switch is closed, CR1 will be turned on.
When CR1 goes on switch SW2 can turned on CR2.
When CR2 goes on PL1 turned off.

**OR**

**Q.5** **(a)** Draw the ladder diagram PLC connection for the following operations: **07**

When lights are turned off in a building, an exit door light should remain on for additional 50 seconds.
When door light turned off, the parking lot light should remain on for additional 3 minutes.

**(b)** Explain in brief the PLC analog I/O modules and analog signal processing. **07**

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