GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII • EXAMINATION - SUMMER • 2015

Subject code: 180908

Subject Name: Advanced Processor and Controller

Time: 10.30AM-01.00PM

Instructions:

Total Marks: 70

Date:05/05/2015

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Explain Skip function and Master Control Relay function of 07 PLC with appropriate ladder logic diagram.
 - (b) Develop the PLC ladder diagram of the following systems. 07

1) A Electric Motor is to be run only when all of the following conditions are met,

- A. Input 1 is off
- B. Input 2 is on and input 3 is on.
- C. Input 5 in on or input 6 is on, or both are on
- D. One or more of inputs 7,8 or 9 is on.

2) A fan is to be started and stopped from any one of the four locations. Each location has a start and a stop button.

- Q.2 (a) Develop the connection diagram and PLC ladder logic 07 diagram of the following system. There are three mixing devices on a processing line: A, B and C. After the process begins, mixer A is to start after 7 seconds elapse. Next, mixer B is to start 3.6 seconds after A. Mixer C is to start 5 seconds after B. All then remain on until a master enable switch is turned off.
 (a) Develop the connection diagram and PLC ladder logic 07
 - (b) Discuss the properties of the convolution of discrete time 07 system and determine the output response y(n) of a relaxed LTI system with impulse response, h(n)=aⁿu(n), |a|<1 when the input is a unit step sequence, that is x(n)=u(n)

OR

- (b) Determine the zero-input response of the system described 07 by the homogeneous second order difference equation y(n) 3y(n-1) 4y(n-2)=0
- Q.3 (a) Find the one side Z-Transform of the following discrete 07 time signals
 - a) $x(n)=n^2$
 - b) $x(n) = \cos \omega nT$
 - (b) Explain the block diagram of DSP. Also discuss the **07** advantages of DSP over ASP.

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- Q.3 (a) Determine the inverse Z-Transform of $X(Z) = \frac{1+2Z^{-1}}{1-2Z^{-1}+Z^{-2}}$ With (a) ROC | Z | > 1 (b) ROC | Z | < 0.5
 - (b) Determine whether following systems are time invariant or **07** not?
 - (a) y(n) = x(-n)(b) y(n) = 2y(n) - 2y(n)
 - (b) y(n) = 3x(n) 2x(n-1)
- Q.4 (a) Explain operation of compare units of LF2407 DSP with 07 block diagram. Also discuss its input and output.
 - (b) Discuss the General Purpose timer of LF2407 DSP. 07
 - OR
- Q.4 (a) Explain Event Manager Interrupts of LF2407 DSP in 07 details.
- Q.4 (b) Write the DSP LF2407 assembly code for generation of 07 fixed duty cycle PWM signal using GP timer compare function.
- Q.5 (a) Discuss the different components of LF2407 DSP core. 07
 - (b) Explain interrupt control registers of LF2407 DSP. 07

OR

- Q.5 (a) Explain GPIO pin in LF2407 DSP with suitable block 07 diagram. Also discuss I/O MUX control registers and data control register.
 - (b) How JTAG port to be utilized in LF2407 DSP core? Also **07** state the features of CCS.
