## TINIXEDSTTV CULLADAT TECHNOLOCICAL

GUJAKAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VIII (OLD) - EXAMINATION – SUMMER 2017 Subject Code:182001 Date:04/05/2017			
Subject Name: Programmable Logic Controllers         Time:10:30 AM to 01:00 PM         Instructions:         1. Attempt all questions.			70
	2 3	<ul> <li>Make suitable assumptions wherever necessary.</li> <li>Figures to the right indicate full marks.</li> </ul>	
Q.1	<b>(a)</b>	List various advantages of PLC based control system over electromechanical relay based control system.	07
	<b>(b)</b>	Explain architecture of PLC in detail using suitable diagram.	07
Q.2	(a) (b)	Explain various rules for designing PLC ladder diagram. Write a detailed note about IL programming for PLC. OR	07 07
	<b>(b</b> )	Explain single channel digital output card of PLC using suitable diagrams.	07
Q.3	(a)	Explain On Delay Timer and Off Delay Timer instructions used in PLC programming using their timing diagrams.	07
	<b>(b)</b>	Explain various fault find technique in PLC based systems.	07
Q.3	(a) (b)	Explain analog input module of PLC using suitable diagrams. Describe commissioning of PLC in detail.	07 07
Q.4	(a)	Explain various JUMP instructions in PLC programming using suitable diagrams.	07
	(b)	Design and draw PLC functional block diagram program for the following equation. X = A + B (A + CB + DAC) + ABCD A, B, C and D are digital inputs and X is digital output.	07
Q.4	(a) (b)	List and explain various arithmetic instructions used in PLC programming. Design and draw a ladder diagram to generate a square wave of the period of 10 seconds when a toggle switch is made on.	07 07
Q.5	(a) (b)	<ul> <li>Design and draw PLC ladder program for systems that will carry out the following tasks:</li> <li>(a) Switch on an output A 5 seconds after receiving an input and keep the output on for the duration of 10 seconds.</li> <li>(b) 5 seconds after the output A is turned on, switch on another output B and keep the output on for 20 seconds.</li> <li>If a stop input is given at any time, switch off both the outputs if on.</li> <li>Two potentiometers are connected to PLC inputs. The range of both the potentiometer output is 0 to 10 V DC. When both the potentiometer outputs are</li> </ul>	07 07
		equal and more than 50%, a DC motor will be in ON condition; otherwise the motor will be in OFF condition. Furthermore if first potentiometer output is higher, a GREEN lamp will be in ON condition and if second potentiometer output is higher, a RED lamp will be in ON condition. Design and draw a ladder diagram to execute the sequence correctly. <b>OR</b>	

- Q.5 (a) List various counter functions in PLC programming and explain any one of 07 them using suitable example.
  - (b) Design and draw a ladder diagram for the control of the following system. 07 When digital input A is high and the value of analog output X is between 100 to 500, a digital output B will turn on. The value of x will vary as per following equation  $X = y+2(y+y^2)$ , where y is an analog input

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