Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) EXAMINATION – WINTER 2017

Subject Code: 2182001 **Date: 02/11/2017**

Subject Name: Programmable Logic Controllers

Time:02:30 PM TO 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)**	Explain any three advantages of PLC.	**03**
	(b)	Explain scan cycle of PLC using suitable diagram.	**04**
	(c)	Draw the block diagram of PLC and explain the same in detail.	**07**
Q.2	**(a)**	Give Instruction List (IL) program for the following Boolean equation. X=D(A+B+C) Where X=digital output, A, B, C and E are digital inputs.	**03**
	(b)	Give the list of any three devices which can be used to give input to the PLC from a plant. Also draw wiring diagram showing connections of these devices to PLC.	**04**
	(c)	Explain AC output card for PLC using suitable diagram.	**07**
		OR	
	(c)	Using suitable diagram, explain remote I/O modules of PLC. Also give advantages and disadvantages of remote I/O modules.	**07**
Q.3	**(a)**	Explain UP counter instruction for PLC.	**03**
	(b)	Give FBD program for two inputs EX-OR gate.	**04**
	(c)	There are two machines M1 and M2. Each machine has a separate start push button. There is one master stop push button. The system can be started only by starting of M1. While the system is running, start of one motor will stop the other running motor (that means only one motor will run at a time).When master stop push button is pressed, both the motors will stop. Write Instruction List program for PLC to control this process.	**07**
		OR	
Q.3	**(a)**	Explain latching relay instruction used in FBD programming of PLC using its truth table.	**03**
	(b)	Explain PULSE timer instruction of PLC using timing diagram.	**04**
	(c)	Write a detailed note on SFC programming of PLC using suitable example.	**07**
Q.4	**(a)**	Explain PLC data MOVE function.	**03**
	(b)	A fan is to be started and stopped from any one of three locations. Each location has separate start and stop push buttons. Construct a ladder diagram to control this operation.	**04**
	(c)	Using suitable diagram, explain analog input module of PLC.	**07**
		OR	
Q.4	**(a)**	Explain PLC SKIP function.	**03**
	(b)	There are three machines. Each machine has a separate start and stop pushbuttons. Only one machine should run at a time. Develop PLC ladder diagram to control this operation.	**04**
	(c)	Explain various number comparison functions in PLC.	**07**
Q.5	**(a)**	List and explain environmental factors that may have effects on PLC operation.	**03**

(b) Construct a ladder diagram for the following operation. **04**
When a start push button is pressed, and output L will turn on after 10 seconds and then it will turn off after 15 seconds automatically. If a stop pushbutton is pressed at any time, the system is to be reset.

(c) Three conveyors feed parts to main conveyor. Construct a ladder diagram to obtain the total count of parts on the main conveyor. The count of parts on the main conveyor should be updated only after each 15 seconds. **07**

OR

Q.5 **(a)** Justify the statement: A PLC is an industrial computer. **03**

(b) There are two conveyors, each with sensors to count input and output of parts entering and leaving the conveyors. There are three indicating lights for the process as follow: **04**

(1) Number of parts on conveyors are equal - White light
(2) Number of parts on conveyor 1 is greater - Green light
(3) Number of parts on conveyor 2 is greater - Red light

Develop and draw PLC ladder diagram to control the operation of three lights.

(c) List various factors for PLC selection. **07**

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