Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2018

Subject Code:2161709 **Date:30/11/2018**

Subject Name:Programmable Logic Controller

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.**

			MARKS
Q.1	**(a)**	List the benefits offer by PLC. Explain at least four in brief.	**03**
	(b)	Why programming tools are essential part with PLC operation? How it differ from Personal Computer as programming tool? Explain it technically.	**04**
	(c)	List the input field and output field device and draw its equivalent ladder Symbols.	**07**
Q.2	**(a)**	Explain differences between fixed I/O's and modular I/O's.	**03**
	(b)	What is the advantages offer by HMI? Explain it in details	**04**
	(c)	Develop Ladder logic diagram for each of the following Boolean expressions using AND, OR, and NOT gates: (a) $Y = ABC + D$ (b) $Y = AB + CD$ (c) $Y = (A + B)(\bar{C} + D)$	**07**
		OR	
	(c)	Draw and describe Input Image Table and Output Image table.	**07**
Q.3	**(a)**	How will High Speed Counter module works? Describe with Suitable Application	**03**
	(b)	Describe with neat sketch and operation with PLC (1) Proximity Sensor (2) Magnetic Reed Relay.	**04**
	(c)	Prepare Ladder Logic Diagram (LLD) for following process control. Fill tank (T) fully by opening inlet solenoid valve SV-1. When it full, open outlet valve SV-2 for 5 sec. Either open SV-1 for 10 sec or till the tank is full which will occur first than open SV2 again. Repeat it continuously.	**07**

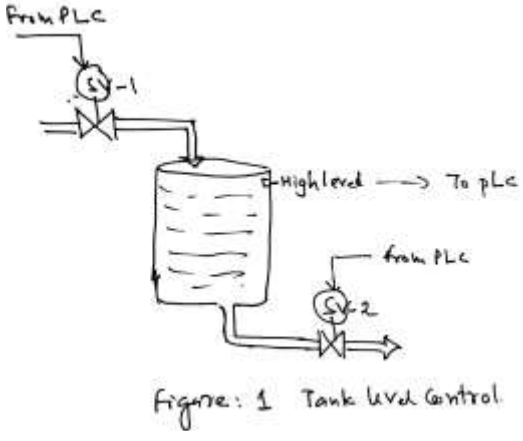


Figure: 1 Tank level Control

		OR	
Q.3	**(a)**	Why Latch and Unlatch Instruction required in PLC Programming? How it is close to retentive timer operation.	**03**
	(b)	Draw and describe ON Timer delay instruction with suitable example	**04**
	(c)	Prepare LLD to count how many persons attend reception in dining hall? Use counter at entry as well as at exit.	**07**

Q.4 **(a)** How floating point math instruction is differ than conventional math instruction ? Explain for ADD, SUB, MUL and DIV instruction. **03**

(b) Draw and design LLD to generate wave from with 40% duty cycle at digital output terminal when toggle switch is ON. Take output frequency y generated by assigning TIMER as 5 sec On time and 3 sec OFF timer **04**

(c) Prepare LLD to Turn-On Lamp-1 for 5 sec, Lamp-2 for 10 sec, Lamp-3 for 15 sec and Lamp-4 for 20 sec sequentially (At a time only one lamp will be ON). Repeat it continuously. **07**

OR

Q.4 **(a)** Why tuning is required in PID Module? Describe PID module along with technical reason. **03**

(b) Justify the need of Interrupt in PLC operation. Describe following instruction **04**

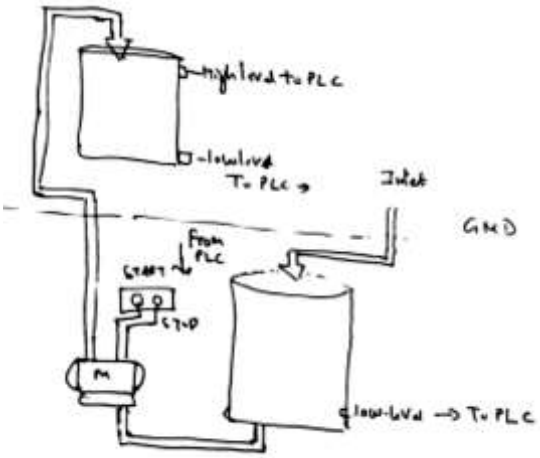
1 ENI 2. RETI
3. DTCH 4. CLR_EVNT

(c) Develop LLD an alarm annunciator system. Switch OFF the lamp when 120 sec passed without any acknowledgement. **07**

Q.5 **(a)** How will you implements communication network for PLC? Explain with industrial communication. **03**

(b) Draw and illustrate twin axis Robot with PLC sequencer control **04**

(c) Prepare LLD for following Level Control System. **07**
Be sure motor star when Low Level switch is OFF(Open) and Overhead tank High switch is Open (OFF).

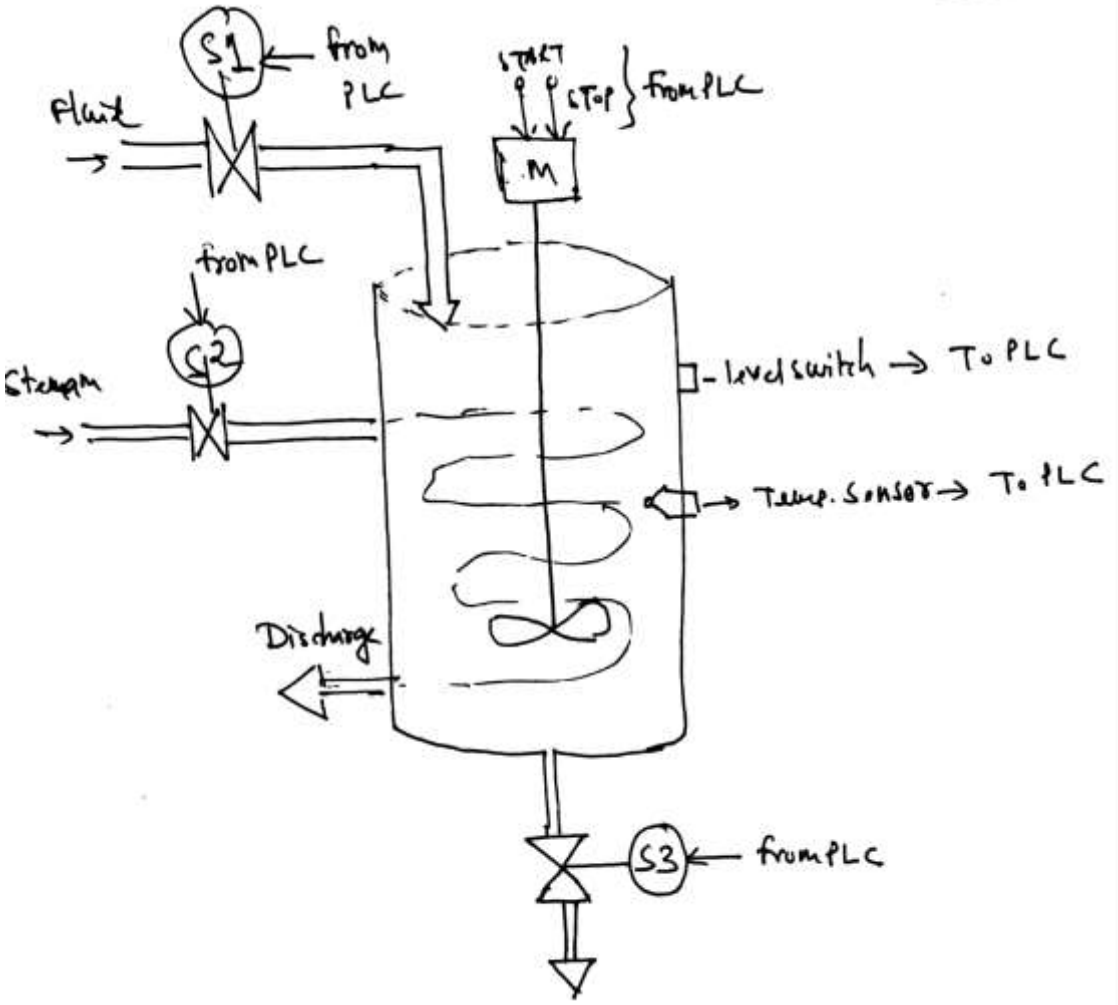


OR

Q.5 **(a)** Enlist data handling Function. Describe for data move and rotate instructions. **03**

(b) Describe with ladder diagram, **04**
Structured Text
Function block diagram
Instruction list
sequential function chart type PLC Languages

(c) Prepare LLD for Batch process control **07**
1. Open SV-1 to fill fluid in the tank till level switch will be ON. Otherwise OFF.
2.Be sure once level achieved, SV-2 will open,
3. Motor will be started, Wait till temperature achieved.
4. Stop motor. OFF SV-2
5. ON SV-3 for 10 sec
5. Repeat from step 1 .
Be sure once SV-2



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