

Enrolment Number: \_\_\_\_\_

PARUL UNIVERSITY  
FACULTY OF ENGINEERING & TECHNOLOGY  
B.TECH MIDSEM EXAMINATION  
7<sup>th</sup> SEMESTER  
ACY -2022-23 (ODD SEM)

Subject Name (Code): Industrial Automation(03106382)

Branch: Electrical

Date: 08/08/2022

Time:

Total Marks: 40

Sr. No.		Marks
Q.1	(1) Ladder logic programming primarily consists of	05
(A)	(a) Logic gates symbol and connecting lines (b) Virtual relays contacts and coils (c) Functional blocks and connecting lines (d) Text-based codes	
	(2) In PLe operation _____ retrieves the data into an output module (a) Input Scan (b) Output Scan (c) Programme Scan (d) None of the above	
	(3) In modular type PLe, the PLe's are classified into (a) Relay output PLe (b) Transistor output PLe (c) Triac output PLe (d) All of the above	
	(4) The programmable logic controller works on _____ (a) Parallel mechanism (b) Sequential mechanism (c) Series mechanism (d) All of the above	
	(5) An OR function implemented in ladder logic uses: (a) Normally-closed contacts in series (b) Normally-open contacts in series (c) Normally-open contacts in parallel (d) Normally-closed contacts in parallel	
(B)	(1) For NPN output type sensor _____ type of PLe input is required. 05 (2) For sink connected PLe inputs _____ type of sensors are required.	
	(3) The amount of time it takes the PLe to get from one I/O update to the next is referred to as	
	(4) The address for bit number 27 of a 32-bit output module plugged into slot 3 would be	
	(5) Colored contact in PLC ladder diagram indicates	
Q.2	Attempt any four(Short Questions)	12
	(1) Draw the basic block diagram of PLe with basic components.	
	(2) Conveyor A is to run when any one of four inputs is ON. It is to stop when any one of four other inputs is ON.	

- (3) Draw the diagram for Sink-connected PLC inputs.
- (4) A process fan is to run only when all the following conditions are met.
- Input 1 is off.
  - Input 2 is on or input 3 is on, or both 2 and 3 are on.
  - Input 5 and 6 are both on.
  - One or more of inputs 7, 8 or 9 is on.
- (5) Define the Scan, Scan time and Scan rate
- Q.3 Attempt any two 08
- Draw the ladder logic for instant forward and reverse direction of motor without first depressing the stop button. Each direction's has its own start button and single stop button stops either direction of operation.
  - A signal lamp is required to be switched on if a pump is running and the pressure is satisfactory, or if the lamp test switch is closed. Draw the ladder diagram.
  - Draw the ladder logic diagram for a system where there has to be no output when any one of four sensors gives an output, otherwise there is to be an output.
- QA (A) In the system four inputs and three outputs are available. Prepare the ladder logic for following situation. 05
- Anyone of the input from four input is ON then no output is ON.
  - Any two of the inputs from four inputs are ON the output-1 is ON.
  - Any three inputs from four inputs are ON then the output-2 is ON.
  - All the four switches are ON then output-3 is ON.
  - At a time anyone output should be ON from all the three output.
- (B) Draw the ladder logic for the following conditions: 05
- A motor MI is to start only if start-1 (NO) button is pressed.
  - It will stay running when star-1 is released.
  - Only after MI has started motor M2 be start by depressing start-2 (NO).
  - Once it is started, it will stay running even if MI has shut down.
  - MI is stop running after M2 starts.
  - If at any time stop-1 button is depressed both motor will stop.
- OR
- (B) Draw the ladder logic diagram for the following conditions: 05
- ~ Push button to start the motor: The motor should continue to rotate even when the push button is released.
  - ~ Stop Push button to halt the motor after it started.
  - ~ Over current protection: In case of over load, the motor should stop automatically by the signal coming from contactors of overload relay.
  - ~ Limit switch: It should prevent the motor from starting and can also stop the running motor.
  - ~ The motor starter should also have indicator (Lights) to show ON or OFF status of motor.