

Enroll No

Q.P. Code
M 25

**Course Code: EC4114**

**Course Name: Industry Automation**

Day & Date: Thursday, 18/09/2025

Time: 3.15pm-5.15pm

Max Marks- 50

- Instructions:**
- 1) All questions are compulsory.
  - 2) Figures in rounded ( ) brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
  - 3) CO is the index number of the Course Outcome statement.
  - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
  - 5) Assume suitable data if necessary.
  - 6) Use of non-programmable calculators is allowed

- |   | Marks | BT Level | COs |
|---|-------|----------|-----|
| Q.1 A) Explain (6M), with the help of suitable schematics (2M), the functioning of light sensors in industrial applications   | 08    | L2       | CO1 |
| OR  |       |          |     |
| Explain (6M), with the help of suitable schematics (2M), the functioning of ultrasonic sensors in industrial applications.  |       |          |     |
| B) For the circuit diagram shown in Fig. 1B, if $V_s$ is sinusoidal supply voltage of 100V rms and firing angle for the SCR is 30 degrees, i) Sketch the $V_{R1}$ , $V_{R2}$ and $I_o$ signal waveforms in line with the $V_s$ waveform. (1 M each), ii) determine the power delivered to the R1 and R2 loads (3 M each). | 09    | L3       | CO3 |

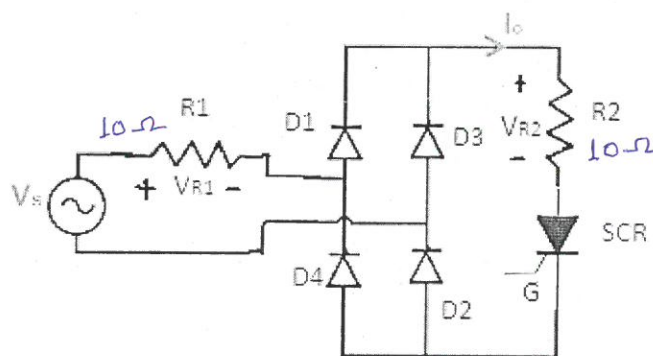


Fig. 1B

- |  |    |    |     |
|--|----|----|-----|
| Q.2 A) With the help of suitable example, explain PLC programming for electrical interlocking circuits.  | 08 | L2 | CO1 |
| B) Design a PLC ladder diagram for a motor control circuit with two start/stop buttons. When either start button is depressed, the motor runs. By use of a seal-in contact, it continues to run when the start | 04 | L5 | CO4 |



	Marks	BT Level	COs
button is released. Either stop button stops the motor when it is depressed			
C) Design a 4:1 multiplexer using ladder logic.	05	L5	CO4
A) The temperature of water in a tank is controlled by a two-position control. The temperature oscillates around the set point. The set point is 350 K and the neutral zone (differential gap) is $\pm 2\%$ of the set point. The period of oscillation is 24 min. Assuming an equal rate of temperature drop and rise and there is no lag at both the ON and OFF switch points, calculate a) the rate of rise of the temperature (4M) b) period of oscillations for $\pm 5\%$ neutral zone and the rate of rise of the temperature value calculated in (a) (4M).	08	L4	CO3
B) Compare the PLC and PC with regard to:	08	L4	CO3
a. Physical hardware differences			
b. Operating environment			
c. Method of programming			
d. Execution of program			
OR			
Compare Fixed I/O PLCs with Rack-based I/O PLCs.			

