MECHATRONICS

Department of Mechanical Engineering – SEAS

SRM UNIVERSITY A.P

Registration Number: _____

Name: _____

Branch & Section: _____

SRM UNIVERSITY AP
Andhra Pradesh

SRM UNIVERSITY – AP, ANDHRA PRADESH

End Term Examination, May 2025

[Question Paper ID: **009144]**

Subject Title	: MECHATRONICS	**Subject Code**	: MCE 242
Batch	: 2022, 2023	**Max Marks**	: 100
Degree	: B.Tech.	**Duration**	: 3 hours
Branch	: CSE, ECE, EEE	**QP Set**	: ---

Section A (5 × 6 Marks = 30 Marks)

Answer **all** Questions

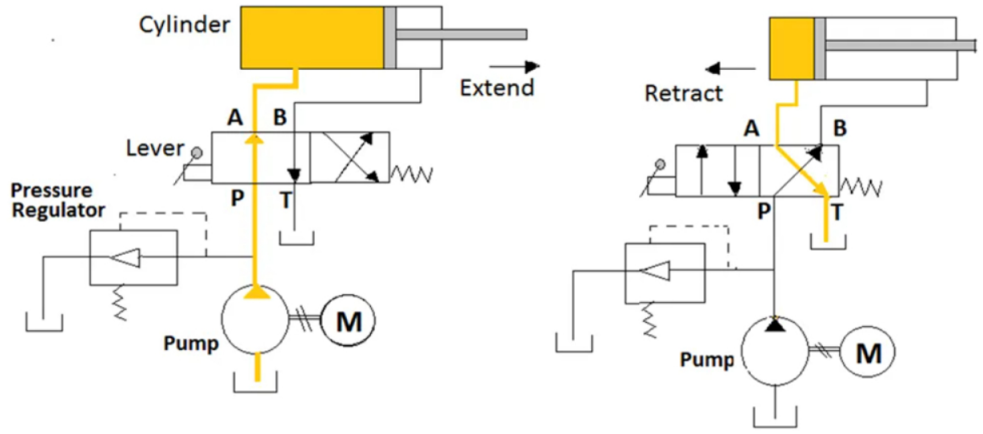
				Marks	BL	CO
1.	1.	Distinguish between open loop and closed loop control system. **(3 Marks)**	**6**	6	2	1
	2.	Distinguish between serial communication and parallel communication. **(3 Marks)**				
2.	Briefly outline the principle of the following: **(2 x 3 = 6 Marks)**		**6**	6	2	2
	1.	Strain gauge				
	2.	Thermocouple				
3.	1.	Distinguish between pneumatic and hydraulic systems. **(3 Marks)**	**6**	6	2	3
	2.	Briefly outline the principle of solenoid and its use in fluid power systems. **(3 Marks)**				
4.	1.	Briefly outline the scanning process in a PLC. **(3 Marks)**	**6**	6	2	4
	2.	Distinguish between NO and NC. **(3 Marks)**				
5.	Distinguish between the microprocessor and the microcontroller.		**6**	6	2	5

Section B (5 × 14 Marks = 70 Marks)

Answer **all** Questions

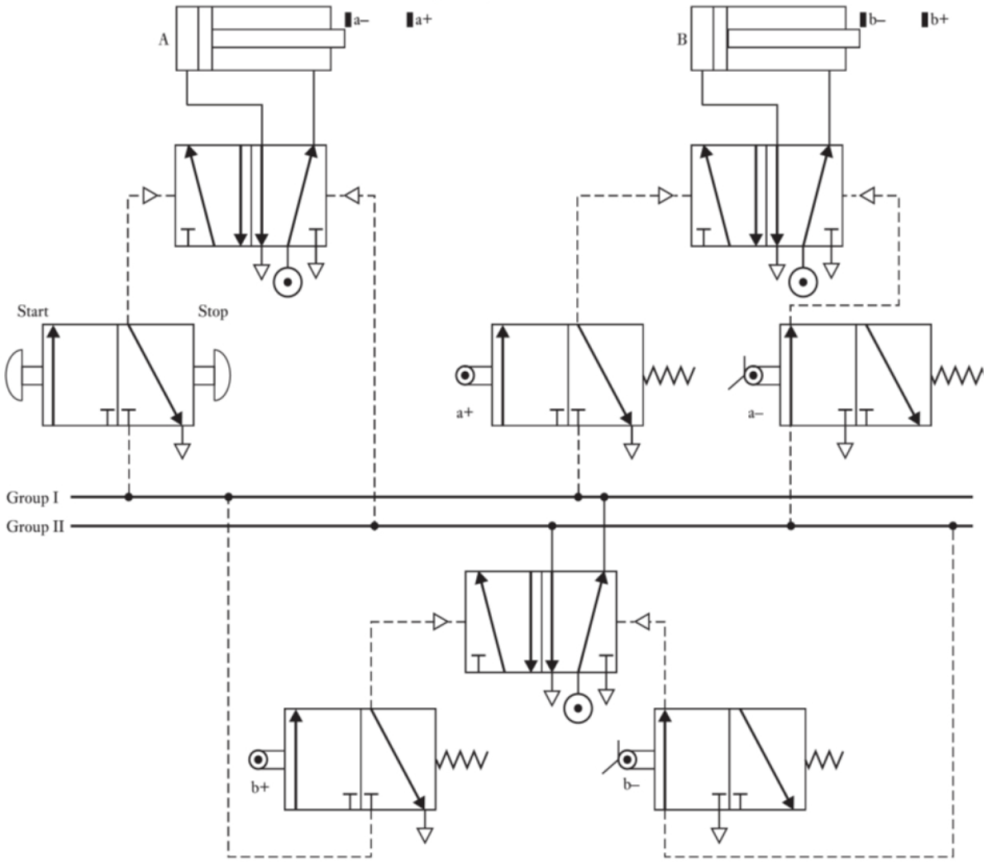
				Marks	BL	CO
6.	**(a)**	You are asked to design and fabricate a working model of ANY ONE of the following mechatronic system using a low-cost controller such as Arduino. • Elevator for a six-storey building OR Automatic coffee vending machine Describe all aspects of the design such as from conceptual design, fabrication, parts required including sensors and actuators, controller design and user interface.	**14**	14	6	1
		(OR)				
	(b)	1. Describe the RS-232 Serial communication protocol, also highlighting the DB-9 and DB-25 connectors. **(10 Marks)** 2. How are Rs-422 and RS-423 different from RS-232? **(4 Marks)**				
7.	**(a)**	1. Describe the principle of an incremental encoder and its application. **(6 Marks)** 2. Describe ANY TWO sensors used for temperature measurement. **(8 Marks)**	**14**	14	2	2
		(OR)				
	(b)	1. Describe the need and the principle of temperature compensation of strain measurement. **(7 Marks)** 2. Describe the principle of operation of a force-torque sensor. **(7 Marks)**				
8.						

(a)



(OR)

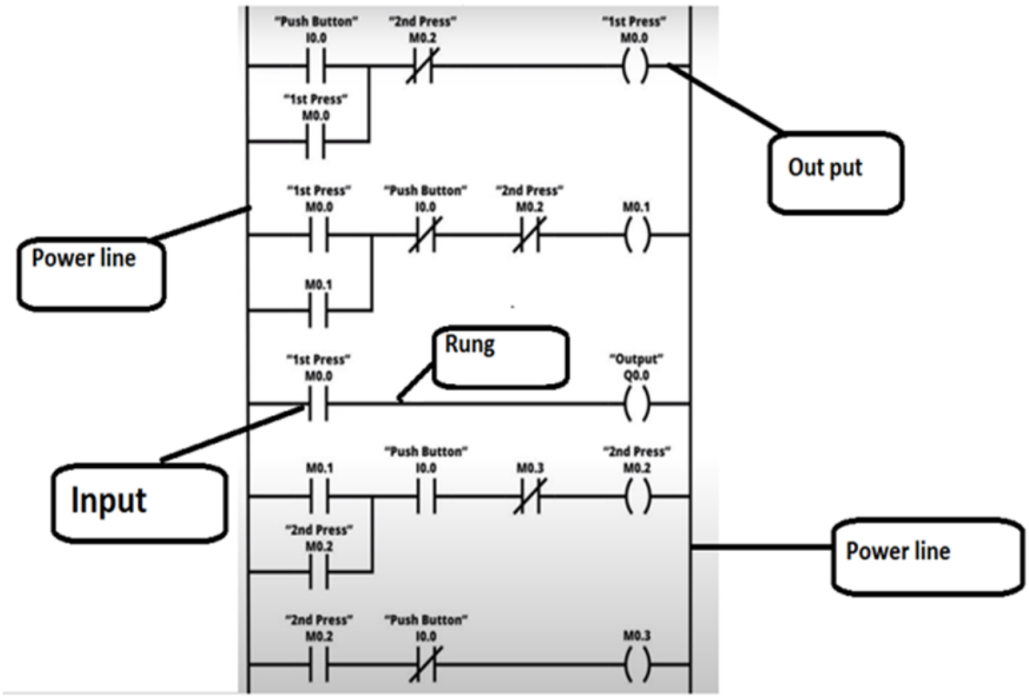
(b)



9. **(a)** 1. List the five different methods of PLC programming. **(5 Marks)**
   2. Write down the specifications of a typical PLC. **(4 Marks)**
   3. Write the ladder program for the following actions to be executed in the order listed: **(5 Marks)**
   4. Single-push switch (IN001) starts Motor A (CR001)
   5. Single-push switch (IN002) stops Motor A but starts Motor B (CR002)
   6. Motor B turns off automatically after 15 seconds.

(OR)

(b) 1. Draw the ladder diagram for ANY FOUR Boolean logics. **(6 Marks)**
2. Briefly describe the functioning of the ladder logic diagram given below: **(8 Marks)**



				14	**14**	**4**	**4**

10.	**(a)**	1.	Draw the pin diagram of the 8051 microcontrollers. **(7 Marks)**	**14**	**14**	**2**	**5**
		2.	Describe ANY THREE addressing modes of a microprocessor with example. **(7 Marks)**				
			(OR)				
	(b)	1.	Distinguish between the program counter and the instruction register. **(3 Marks)**				
		2.	Write the8051 instructions to move the value 34H into Register A, 3FH into Register B, and then add them together. **(5 Marks)**				
		3.	Explain the operations specified by each of the following instructions: **(6 Marks)**				
		4.	STAB $35				
		5.	CMP A #$CS				
		6.	LDAA #$F2				

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