Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APRIL / MAY 2024

PRINTING AND PACKAGING TECHNOLOGY
Semester – IV
ME5752 & MECHATRONICS
(Regulation 2019)

Time:3 hrs. Max. Marks: 100

CO1	Identify suitable sensors to develop mechatronics systems
CO2	Explain the architecture and timing diagram of microprocessor, and also interpret and develop programs.
CO3	Devise appropriate interfacing circuits to connect I/O devices with microprocessor
CO4	Implement PLC as a controller in a mechatronics system
CO5	Design an apt mechatronics system for a real time application

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2=20 Marks)
(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	Illustrate the graphical representations of mechatronics systems and their applications.	2	1	2
2	What is the operating principle of LDR sensors?	2	1	2
3	List four instructions that control the interrupt structure of the 8085 Microprocessor.	2	2	2
4	What is the function of the READY pin on the 8085 microprocessors?	2	2	2
5	What are the applications of digital and analog converter interface with 8255?	2	3	3
6	How is a digit displayed on a common anode 7- segment display?	2	3	2
7	Devise a timing circuit using Programmable Logic Controller (PLC) that will switch an output on for 15 seconds then switch it off.	2	4	4
8	Draw a ladder logic diagram illustrating a system with two normally open switches, where both switches must be closed for a motor to operate.	2	4	3
9	What parameters should be considered when designing an intelligent mechatronic system?	2	5	3
10	How does the traditional design of a weighing machine differ from a mechatronics-based design?	2	5	3

PART- B (5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a)	Explain the construction and working principle of LVDT?	13	1	2
	OR			
11 (b)	Describe any two types of temperature sensor and provide a clear sketch for each.	13	1	2

Q. No	Questions	Marks	CO	BL
12 (a)	Explain the architecture of the 8085 Microprocessor with a detailed block diagram.	**13**	2	3
	OR			
12 (b)	Create a timing diagram for the DCR M instruction and calculate how long the CPU will take to complete the operation. The opcode for this instruction is 35_H. The contents of the H and L registers are AB_H and CD_H respectively, with the memory location value set to 00_H. The crystal frequency is 6 MHz	**13**	2	3
13 (a)	Explain the steps involved in developing a temperature control system utilizing a microprocessor.	**13**	3	3
	OR			
13 (b)	Describe the approach for using the 8085 microprocessors to implement a traffic light control system.	**13**	3	3
14 (a)	Describe the architecture of a PLC using a clear sketch, and explain the logic functions used in serial and parallel configurations.	**13**	4	3
	OR			
14 (b)	Design a PLC-based system to automatically control the reciprocation of double-acting cylinders A and B in the following sequence: $A^+B^+B^-A^-$. Also, provide an illustration that demonstrates how input/output (I/O) devices are connected to the PLC ports.	**13**	4	3
15 (a)	Compare the methods of actuating a rotary joint of a robot by a stepper motor and a servo motor.	**13**	5	3
	OR			
15 (b)	Explain how to create a car engine management system by employing mechatronics.	**13**	5	3

PART- C (1x 15=15Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	Design a PLC circuit for the following application. Consider a conveyor belt that is to be used to transport goods from a loading machine to a packaging area. When an item is loaded onto the conveyer belt, a contact switch might be used to indicate that the item is on the belt and start the conveyor motor. The motor then has to keep running until the item reaches the far end of the conveyor and falls off into the packaging area. When it does this, a switch might be activated which has the effect of switching off the conveyor motor. The motor is then to remain off until the next item is loaded onto the belt.	**15**	4	6