Question Paper Code	14133

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025
Sixth Semester
Mechanical Engineering
20MEPC603 - MECHATRONICS
Regulations - 2020

Duration: 3 Hours　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K–Level	CO
1.	A thermocouple is a type of (a) Passive transducer　(b) Active transducer　(c) Analog transducer　(d) Digital transducer	1	K1	CO1
2.	Which temperature sensor is most accurate over a wide range? (a) Thermistor　　　(b) RTD　　　(c) Thermocouple　　　(d) Infrared sensor	1	K1	CO1
3.	How many pins are there in the 8085 microprocessor IC? (a) 20　　　(b) 30　　　(c) 40　　　(d) 64	1	K1	CO2
4.	Which of the following is not part of the 8051 microcontroller block diagram? (a) UART　　　(b) Timer　　　(c) DMA　　　(d) ALU	1	K1	CO2
5.	Which port of 8255 can be split into two 4-bit ports? (a) Port A　　　(b) Port B　　　(c) Port C　　　(d) Port X	1	K1	CO3
6.	Temperature control systems typically use which control element? (a) LED　　　(b) Buzzer　　　(c) Relay　　　(d) Microphone	1	K1	CO3
7.	Which IEC standard defines PLC programming languages? (a) IEC 60508　　(b) IEC 61131-3　(c) IEC 61499　　(d) IEC 60050	1	K1	CO4
8.	A counter in PLC counts＿＿＿＿＿＿ (a) Time　　(b) Frequency　　(c) Events or pulses　　(d) Current	1	K2	CO4
9.	A DC Servo Motor uses what type of mechanism to control its speed and position? (a) Magnetic field induction　　　　(b) External control signals and feedback (c) Simple rotational force　　　　(d) Inductive coupling	1	K2	CO5
10.	Which of the following fields has benefited the most from mechatronics design principles? (a) Aerospace　　(b) Robotics　　(c) Automotive systems　　(d) All of the above	1	K1	CO6

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

11.	List the key elements of mechatronics.	2	K1	CO1
12.	Show the industrial applications of light sensors.	2	K1	CO1
13.	Differentiate between microprocessor and microcontroller.	2	K2	CO2
14.	Outline the purpose of timing diagram in microprocessors.	2	K2	CO2
15.	What are the operating modes of port A of 8255?	2	K1	CO3
16.	List the significance of ADC interface with microprocessor.	2	K1	CO3
17.	Show the programming methods of PLC.	2	K1	CO4
18.	Recall some common examples for mnemonics used in PLC programming.	2	K1	CO4
19.	Recall any four notable characteristics of servo motors.	2	K1	CO5
20.	Name any four industries adopting stepper motors.	2	K1	CO5
21.	List the phases of mechatronic system design.	2	K1	CO6
22.	How does engine timing controlled in the mechatronic system?	2	K1	CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a)	Explain in detail about the static and dynamic characteristics of transducers.	11	K2	CO1
	OR			
b)	Explain the construction and working principle of LVDT.	11	K2	CO1

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create　　　　**14133**

24.	a)	Explain the addressing modes of 8085 along with two instructions in each mode.	11	K2	CO2
		OR			
	b)	Draw the functional block diagram of 8051 microcontroller and explain the functions of each block.	11	K2	CO2

25.	a)	Explain the architecture of 8255 PPI.	11	K2	CO3
		OR			
	b)	With a neat sketch, explain the interfacing of traffic light control with the 8085 microprocessor.	11	K2	CO3

26.	a)	Explain the construction and I/O details of PLC with neat figure.	11	K2	CO4
		OR			
	b)	Explain the selection criteria for PLC with suitable example.	11	K2	CO4

27.	a)	Explain the construction and working principle of stepper motors.	11	K2	CO5
		OR			
	b)	Explain the construction and working of servo motors along with its torque speed characteristics.	11	K2	CO5

28.	a)	Explain the design aspects of pick and place robot, in terms of various mechatronics elements involved.	11	K2	CO6
		OR			
	b)	Outline feature of stepper motors. Explain the working principles of stepper motor in half step mode.	11	K2	CO6